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KITCHEN MIDDENS

(PREHISTORIC CAMPSITES)

— by —

W. J. ORCHARD

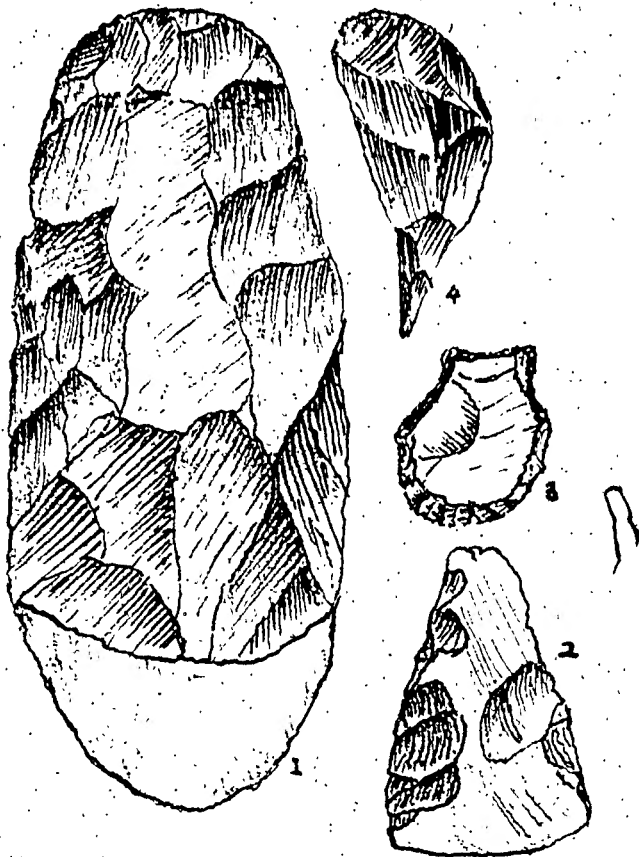
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THE STONE AGE ON THE PRAIRIES*



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**SCHOOL AIDS AND TEXT BOOK
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FRONTISPIECE: 1. FLINT PICK, 4. AWL, 3. SCRAPER, AND
2. TRANCHET.

Midden Life

The midden people had a kitchen
Open to the air.
They didn't sweep it often—
It was ninety paces square.

They ate their mussels, oysters, clams,
They spread the shells around;
'Twas really most untidy,
For it littered all the ground.

The limpet hammers loosened
The shell fish at a clout,
A pin of bone was used to dig
The Periwinkles out.

They had no table-forks, or knives,
Their spoons were made of pearl;
You didn't get a serviette
From any waiter-girl.

But the salmon steaks, so rich and brown,
Were grilled upon a spit,
And the venison roasted on a stone
For any king was fit.

They gathered crunchy hazel nuts
From bushes all around,
They mashed them in a mortar
With pestles smooth and round.

The midden ladies flitted round
In scanty skirts of fur;
They didn't have a kitty cat
To sit around and purr.

They had no income taxes,
Their water rates were low,
Their mode of locomotion was
Like Adam's, very slow.

They didn't wait on corners
For crowded cars to come—
They just set out and hoofed it
To reach their happy home.

Who wouldn't live a midden life,
So happy free from care,
Where all your time is spent in sport
And flowers grow everywhere.

W.J.O.

Preface

When the first white settlers (mostly transported convicts) came to Tasmania they found the native race, numbering about five thousand, living in a stage of culture extremely like that of the very earliest palaeolithic times. Their tools were all of wood or stone and in place of a residence they had merely a temporary wind-break of branches and bark, on the windward side of a fire.

The settlers made war on them and soon reduced their numbers to two hundred. At this stage the government gave them an island of their own and protected them but they were so unfitted to live in the white man's way that in 1876 the last one of the race died.

Prof. Sollas in speaking of the extinction of these very primitive people says in part (and I quote):

"It is not very flattering to our powers of intelligence to find that we allowed this supremely interesting people, the last representatives of one of the earliest stages of human culture, to perish without having made any serious effort to ascertain all that could be known about it. What we do know is very little indeed . . . If any other nation than our own had shown the same disregard for a human document of such priceless value, we should be very outspoken in our censure."

It has seemed to me that in the Saskatchewan Middens we have something so unique and so different from anything of similar kind found not only in the province but anywhere in Canada, that before these things pass away and are obliterated some record should be put into permanent form for the information of future scientists who may blame us severely if we fail to perform this service.

As one who has been in touch with all the discoveries from the very beginning and in view of the fact that no one else seems to have any intention of doing anything about it, I am venturing to put down in simple form the main facts in regard to it together with illustrations which may be eagerly sought for and used in time to come.

Comparisons are always valuable. Every person has a better grasp of his own language if he knows other languages, especially those which are cognate or those from which our own has been largely derived. When contemplating new laws our legislators always examine similar laws in other countries. In the same way we shall have a better appreciation and understanding of our midden deposits if we know something of middens in other places in the world.

For this reason I have prefaced a discussion of the Saskatchewan middens by giving a brief account of the original middens in Denmark, the shell heaps of Nova Scotia, the great Fraser

Midden and the Eburne Midden of Vancouver with a slight reference to those of Japan and Scotland.

All of these have been ably dealt with years ago, in fact, so long ago that many of our present-day amateur archaeologists may never have read or heard much about them.

They may therefore be glad to have them reviewed and collected into compact form in the same volume, with an account of this, the very latest discovery of the kind in Canada. Many of the illustrations are original and have never been published before.

At the same time I am greatly indebted to the National Museum at Ottawa for permission to use material and illustrations from some of their publications. Sincere thanks are due also to the City Museum of Vancouver and especially to Mr. Menzies, the curator, for specimens, information, and illustrations which he so kindly made available to me. Thanks are also due to several of our local collectors for the loan of valuable specimens to be photographed and used for illustration.

W. J. Orchard,

Regina, Sask.

List of Illustrations

Cover Design: Three harpoons, Marpole.
 Small bone figure, Comox Shell Heap.
 Frontispiece: Flint pick, awl, scraper, tranchet; from
 Denmark.

Plate	Page
2. Bone tools; Danish Middens.....	6
3. Bone comb, adze mounted, pick; Danish Middens.....	9
4. Pottery from Denmark and Nova Scotia.....	12
5. Harpoons; Nova Scotia shell heaps.....	16
6. Arrow heads; Nova Scotia shell heaps.....	19
7. Pottery and markers; Nova Scotia.....	21
8. Knife, adze, pipe, chipping hammer, etc.....	23
9. Celt, beaver tooth mounted, gorgets, awl.....	26
10. Mound in Great Fraser Midden.....	28
11. Map of Marpole and Eburne.....	31
12. Two skulls.....	33
13. Rock paintings; Spain and British Columbia	36
14. Stone image; Marpole.....	40
15. Arrows, knife, celt; Great Fraser Midden.....	42
16. Awls; needle, deerhorn chisel, etc.....	45
17. Harpoons, needle and awl; Marpole.....	48
17a. Trepanned Skull	49
18. Mortar and Pestles.....	51
19. Prehistoric habitation, British Columbia.....	53

20. Diagram of habitation, two Magdalenian drawings	56
21. Pottery; Omori, Japan.....	59
22. Bone, horn and stone artifacts; Omori.....	62
23. Curved knives; Omori.....	64
24. General view; Stony Beach Midden.....	67
25. The Treasure-hunt.....	70
26. Improved screen apparatus.....	77
27. Bone tools; Saskatchewan Middens.....	80
28. Side handle, Basal knives, etc.....	83
29. Pottery marker, thong softener; L.M.....	85
30. Chipping hammer, pipe, cutouts.....	89
31. Bone dagger, two human teeth, hoe.....	92
32. Thong softener, gouge, pottery marker; S.B.M.	95
33. Fragments pottery; Saskatchewan Middens....	97
34. Pottery marked with the two markers.....	99
35. Pottery restored; Swanston & Robinson.....	101
36. Pottery restored; Hooey.....	103
36a. Pottery restored by Orchard.....	106
37. Beads, pendants, discs.....	108
38. Animal remains; Saskatchewan Middens.....	111
39. Horn objects, spatula, bone awls, harpoon; L.M.	113
40. Stone tools; Saskatchewan Middens.....	114
41. Pottery rims.....	119

Contents

DANISH KITCHEN MIDDENS.....	1
THE SHELL HEAPS OF NOVA SCOTIA.....	17
THE GREAT FRASER MIDDEN.....	27
JAPANESE SHELL HEAPS.....	58
SASKATCHEWAN MIDDENS.....	66
THE SCOTTISH SHELL HEAPS.....	116
BIBLIOGRAPHY	124
INDEX	125

KITCHEN MIDDENS

Danish Kitchen Middens

During the whole of the Palaeolithic period the people were food gatherers and not food producers. They depended for food on the products of the chase and such food as nature lavished upon them in the form of nuts, berries, roots and such animal food as grubs, birds' eggs, snails and perhaps other shell-fish, but for the most part these latter were unknown to those who lived inland.

During the Magdalenian period the reindeer was their chief dependence; in fact this period is frequently spoken of as the reindeer period. During this time they found the horns and bones of the reindeer very useful for making tools and weapons and no doubt used the hides for clothing. In their artistic drawings the reindeer perhaps occupies first place with the mammoth a good second.

As the climate became warmer the reindeer found it too warm in France and retreated to colder regions in the north and now are largely confined to Finland and Lapland. No doubt some of the Magdalenians followed the reindeer and it is possible that at that time there was a land passage to America via Greenland,

Iceland, Baffin Land, etc., which may have been joined together by land masses which have since sunk beneath the ocean, just as the continent of Atlantis sank and as the land connection which is known to have existed between France and England was submerged under the North Sea and the English Channel. There was also a subsidence which allowed the waters of the Atlantic Ocean to penetrate into the Baltic Sea, which up to that time had been a fresh water lake, and also opened up the Strait of Gibraltar and lowered the land connection between Tunis and Sicily and Italy.

If this land connection did exist to America, it is not improbable that both the Magdalenians and the reindeer came to America by that route, the Magdalenians becoming the ancestors or partial ancestors of the Eskimo and the reindeer evolving into the caribou which is almost identical.

Now the change from the Palaeolithic mode of life to that of the Neolithic was not sudden; that is, the Neolithic culture did not come in full-fledged at the close of the Magdalenian period. The gap between was filled in with one or more transition cultures.

While the land bridge still was in existence from North Africa into Spain across what is now the Strait of Gibraltar, there came into Spain from North Africa a people who knew the use of the bow and arrow and who were

artistic enough to leave a record of their life in the form of rock paintings, showing hunting scenes with archers partially clothed and even women with steatopygus figures wearing short skirts.

These people came across from a place called Gafsa or Capsa and from this latter are called Capsians. The Capsians spread up through Europe until their culture merged with a degenerate form of the Magdalenian. As remains of this mixed culture are found at the rock shelter of Maz-d-Azil, the name of Azilian has been given to this culture. Azilian remains have been found in the cave of Oban and surrounding country in Scotland, also around the Baltic Sea and in Spain.

Like the Magdalenians the Azilians used harpoons but owing to the disappearance of the reindeer they were forced to make their harpoons from the horns of the stag and as these horns were flatter than those of the reindeer the harpoons were wider, flatter and coarser than those of the Magdalenians. Many of these harpoons were perforated near the base. This may have been for attaching them to the shaft or possibly for the attachment of a cord and float, such as used by the Eskimo.

The life of the Azilians round the Baltic Sea was of a simple and arduous nature. They speared fish, gathered shell-fish and hunted a variety of animals. Their flint work was very

KITCHEN MIDDENS

poor. It consisted of small flint penknife blades, "thumb-nail" scrapers and microlithic flint points of trapezoidal or triangular shape, some of which have been found inserted as barbs in grooves down the sides of bone harpoons or spear points.

If the reader would like a fuller account of the Azilian culture as it appeared in Northern Spain he should get from the public library a book called "Primitive Hearths in the Pyrenees" by Sawtell. This lady with her husband and another lady crawled into some of the caves of the Pyrenees and discovered many Azilian relics including a complete skeleton.

The Azilian mode of life gradually merged into what is called Maglemosean and later this evolved into the life of the Kitchen Middens.

At a certain peat bog on the island of Zealand in the Baltic Sea, the removal of the peat revealed the fact that this had been a site on which certain people had lived for a long time. The name Maglemose has been given to it and the Scotch form would be Muckle-moss, meaning great bog. The theory is that these people, whose relics in many ways resemble those of the Azilians, lived on this site when it was a small lake and built their houses on a big raft of pine. The refuse bones, etc., and many tools, fell into the water and as the lake became filled up with vegetable matter these relics were embedded in the peat. It is believed that this

camp at Maglemose is older than the kitchen middens for several reasons. In the first place fragments of pottery are found in the kitchen middens but none is found at Maglemose. In the second place the earliest growth of trees in this part of the country was pine succeeded considerably later by oak, birch, hazel and other hard woods. Now at Maglemose any remains of wood are all pine, whereas in the kitchen middens many hard woods appear and hazel is especially common, which would furnish one source of food in the nuts.

Again at Maglemose the shells which are found are of fresh water molluscs showing that this camp was occupied during the period while the Baltic Sea was cut off from the ocean. On the other hand the kitchen middens contain shells of salt water molluscs showing that the middens were occupied after the land had subsided sufficiently to allow the ocean to break through the Cattegat Strait, making the Baltic Sea an arm of the ocean.

A little side light on the occupation of the middens is given by the fact that many bones of the swan are found here. Now the swan leaves that part of the country in March and returns in November which would prove that the middens were a winter camp as well as a summer residence.

At Maglemose we find quite a variety of bone and horn tools, including bone daggers

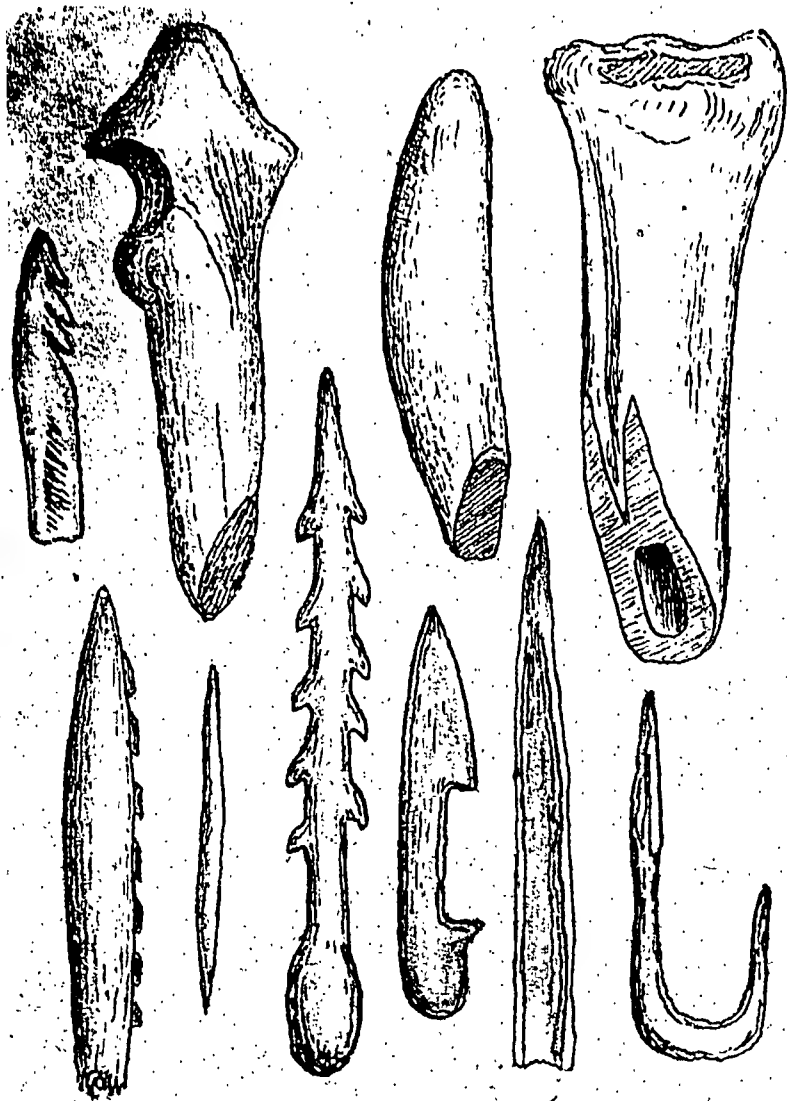


PLATE 2: BONE TOOLS FROM DANISH MIDDENS. HARPOON, DAGGER, CHISEL, AXE, BONE POINT WITH FLINT BARBS, PIN, 2 HARPOONS, AWL, AND BONE FISH HOOK

and fish hooks with axes made of deer horn and having a hole bored through for the insertion of a handle. In some cases the horn bored for a handle served merely as a socket for the insertion of a flint axe. Many axes were mounted transversely, more like an adze than an axe.

It is at this time we first find flint picks such as those found later at Campigny in France, on the Thames in England and in many places in Saskatchewan. This is also the first appearance of the "tranchet", a small flint hatchet formed entirely by chipping, each side of the cutting edge consisting of one large flake. See illustrations of all these types in plates 1, 2, and 3.

And now we come to our real subject, the Kitchen Middens. The name was given by the Danes to the great heaps of shells, bones and other rubbish, found in various places in Denmark or on the islands and shores of the Baltic Sea. The Danish form of the name is Kjekken Moddinge, the latter being a compound word meaning a dung heap and the former word, I suppose, being appended to distinguish them from an ordinary dung heap such as would be found at a stable. The word Moddinge became modified to Midden in Scotland and in the north of England and is still in common use there to denote any heap of rubbish such as might collect near an untidy dwelling.

The Danish kitchen middens are very largely composed of the shells of various types of molluscs consumed over a long period of time by the people who lived there. No doubt these were close to the water at first but later changes in the level of the land caused the water to retreat from some of them and now they are at some distance from the water. This perhaps led to their abandonment. Some idea of the length of time these heaps took to accumulate and the number of people who lived at the site can be formed by the reader from the fact that one of these shell heaps is a thousand feet long, ten feet deep, and of considerable width.

No doubt the reader would like to know the approximate date of the site at Maglemose and the later kitchen middens. While Maglemose was inhabited the Baltic Sea was cut off from the ocean and was consequently a fresh water lake. One of the molluscs living in the fresh water and a main article of diet was a species of limpet whose scientific name was *ancylus*. The scientists often speak of this period as the *ancylus* period. When the level of the land changed so as to allow the Atlantic to break through into the Baltic Sea, the *ancylus* died out and was replaced by several kinds of salt water molluscs, including abundance of oysters and periwinkles. The Latin name of the periwinkle was *littorina*, so this period when the shell mounds were formed has been called the *Littorina* period. The geological movements

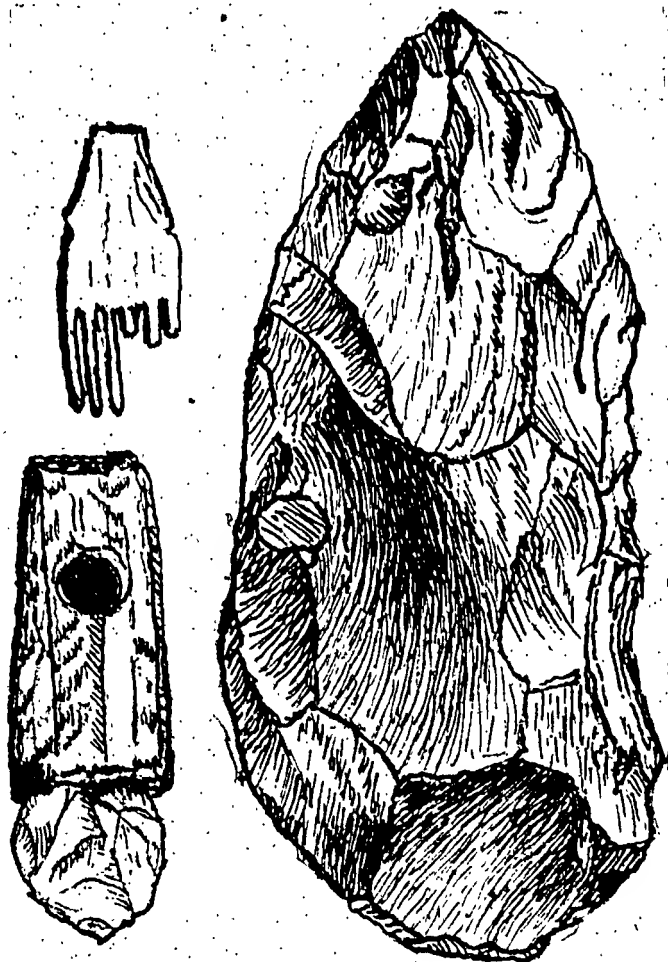


PLATE 3: BONE COMB, FLINT ADZE MOUNTED IN DEERHORN,
FLINT PICK. DANISH MIDDENS.

which caused the above changes must have taken many hundreds of years so that the Ancylus or Maglemose period has been estimated at 7,000 to 5,000 B.C. and the Littorina or shell mound period is put at 5,000 to 4,000 B.C.

The bones found in the shell mounds are similar to those at Maglemose and include deer, wild boar, the great wild ox (much larger than our domestic cattle) the bear, the beaver and a number of others. The elk, however, which was found in the remains at Maglemose, does not appear in the shell mounds and must have become extinct in that region. There are also some bones of birds and fish, in fact one harpoon was found among the bones of a pike.

The teeth of beaver were used as cutting implements. Also, perforated canine teeth of bears and otters were used as pendants or in necklaces. The foot bones of the wild boar were used as handles for flint knives, etc. The bone was cut squarely across near the joint at the small end, thus exposing the natural cavity of the bone as a socket and leaving the larger joint as a convenient handle.

Deerhorn sockets for axes and deerhorn axes are both found here and both are bored for a handle. Picks are also found and some are made from stone other than flint, where flint was not available. Some of the picks had a chisel edge at the end and were almost certainly

used to hollow out a large log to make a boat after part had been burned out by fire. The tranchet is found and as the Neolithic period developed the tranchet merged into the celt or long chisel stone which was sometimes hafted, and later, in the Neolithic period, and on into the bronze age, we find stone axes very like modern axes with a hole bored through for a handle.

A partially bored stone axe has been found showing a circular groove leaving a core in the centre. This shows that the boring was done by rotating a tube with sand and water in the groove to do the cutting. Of course the groove would have to be started by pecking or in some other way before the tube could get a start.

Small scrapers of flint persist from Magdalenian times through the Maglemosean and shell mound periods and on into the full Neolithic. Some of these are found in the Saskatchewan middens, mostly the size of a thumbnail.

The harpoons of the shell mounds were more frequently made from bone than from deerhorn.

An entirely new thing in the shell mounds was the bone comb. These had long teeth and were used not only to straighten the hair but may also have been worn to keep the hair in place. A further use which is quite probable

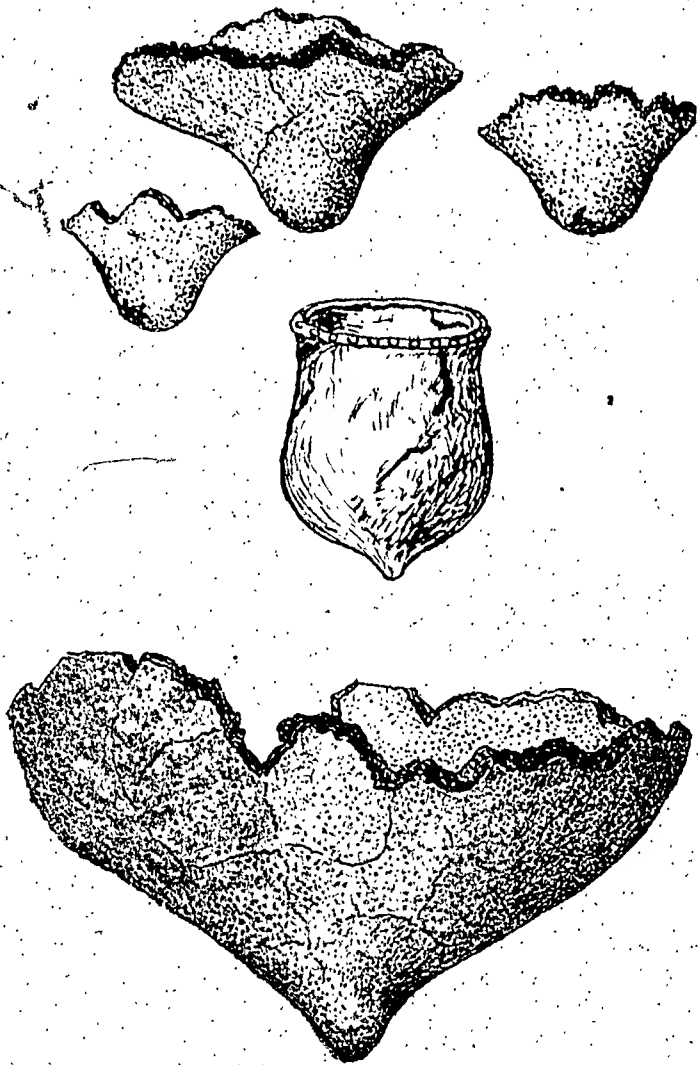


PLATE 4: 1, 2, 3. POINTED BOTTOMS OF POTTERY JARS FROM
NOVA SCOTIA SHELL HEAPS. CENTRE, COMPLETE VESSEL FROM
DANISH MIDDEN. 5. POINTED BASE FROM DANISH MIDDEN.

would be to make a series of parallel lines to decorate the pottery.

The pottery of the shell mounds is naturally rather crude, being made of common clay without the use of a potter's wheel and none of it is glazed. Although most of it is in fragments when found, yet we have been able to establish the most common form which can be seen in outline in plate 4. The remarkable thing about these jars is that they do not have a flat base so that they could stand upright on a flat surface, but they narrow down by graceful reverse curves to a point. This suggests that they could only have been used in one or the other of two ways. Either a thong was put around them at the narrow part of the neck and another thong was used like a bail handle and fastened at each side to the first thong, or the pointed base could be pushed down into the sand or earth. The former way would be suitable for either carrying it or hanging it up. In the latter case, fire could be built under it or if the point were pushed into the sand a fire could be built around it. This would allow them to cook meat or vegetable food by boiling, whereas before the invention of pottery the meat if it were cooked at all would have to be roasted on a spit over the fire or on a hot stone. Also before the invention of pottery they had no means of carrying or storing water while

the pot with the bail handle would be quite convenient for carrying and could be hung up for storage.

There was little decoration on the pottery, except on the rims, and these were pinched into points or had imprints on them of some small tool.

Three bone points were found with grooves down each side in which were inserted a few flint points by way of barbs. One writer suggests that some of the larger stronger harpoon points were fixed on a long shaft to make a javelin and that these could have been used in the chase as well as for spearing fish.

Awls of flint and bone are found but though the bone needle with an eye was known to the Magdalenians, it does not seem to appear in the Danish kitchen middens.

There are some similarities to be noticed between the things of the Danish kitchen middens and those of the shell heaps of Nova Scotia which will appear as we proceed to discuss the latter in our next section.

There is still no sign of agriculture being carried on or of the domestication of animals, except that there is a suspicion that the dog had been tamed.

Some centuries later in the bronze age the pile dwellings in the lakes of Switzerland show conclusive proof of the use of cereals and the keeping of sheep, goats and cattle, although at the same time many of the tools of the pile dwellings found at the bottoms of the lakes greatly resemble some of those in the Danish middens.

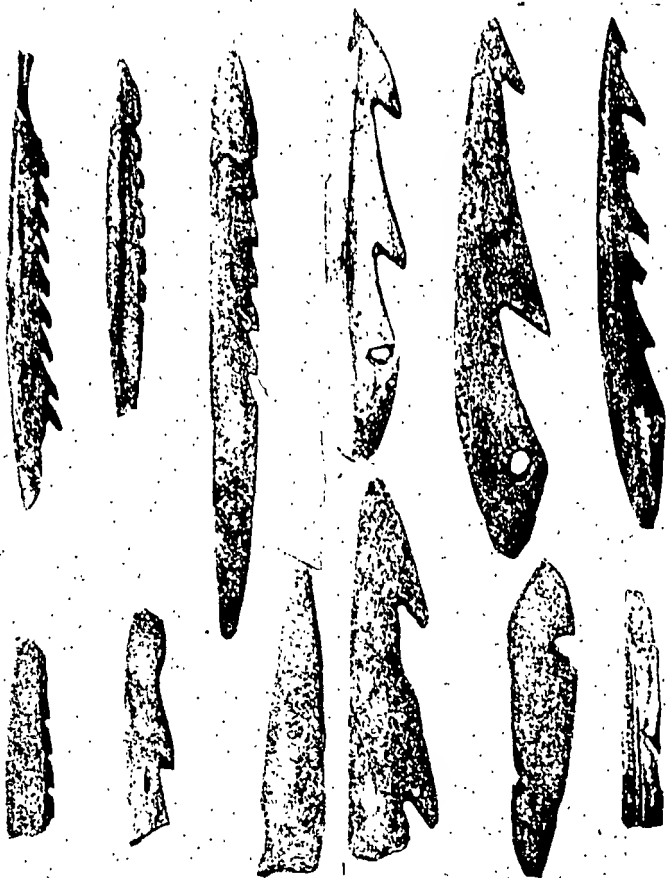


PLATE 5: HARPOONS FROM SHELL HEAPS, NOVA SCOTIA
COURTESY NATIONAL MUSEUM, OTTAWA.

The Shell Heaps of Nova Scotia

The shell mounds are not confined to Europe. Both the Atlantic and the Pacific coasts of the North American continent are dotted here and there with shellheaps, some of them of comparatively recent times and others known to be of a great age.

We of course, as Canadians, have a better chance of getting information about those in our own country and consequently are a little more interested in them, although we have already discussed those of Denmark and at a later stage will give a limited account of those in Japan. Our National Museum at Ottawa has sent expeditions to study the shell heaps of Nova Scotia and have been kind enough to make available to me much of the information obtained and have given me permission to use and re-arrange some of their illustrations.

Around the harbor of Merigomish in Nova Scotia, facing on the Northumberland Strait, there are about eighteen shell heap deposits or middens, some of them on the shore of the mainland and some on islands near by. Mostly these sites have been chosen with southern or

eastern exposures and in most cases are sheltered by hills behind them. Just in front of some of them the water is so shallow that at low tide it is possible to wade across to the island and even around the island. These muddy flats are still fine breeding places for mussels, clams, and a few oysters and in the harbor crabs and eels and several kinds of fish are plentiful. On the mainland there is still a variety of game birds and animals but no doubt much less plentiful than in the early days before the country was settled and while it was still covered with woods.

The soil is rich and wild fruits and nuts are plentiful. The bed rocks of the lowlands are mainly shale, sandstones, and limestones, but higher up there are outcrops of slate quartzite and volcanic rocks. As might be expected the chipped artifacts found in the middens are chiefly made from the harder rock. On account of the coarse refractory nature of some of these rocks the arrows and spearpoints are inclined to be rough and in many cases unsymmetrical.

The bone and deerhorn tools consist mainly of various kinds of awls and harpoons. The latter have barbs on only one side and vary greatly in the number of barbs. Some of the harpoons are perforated at the lower end. Some of the awls are made at great expense of time and labor by cutting strips of bone from large hollow bones and rubbing them on sandstones

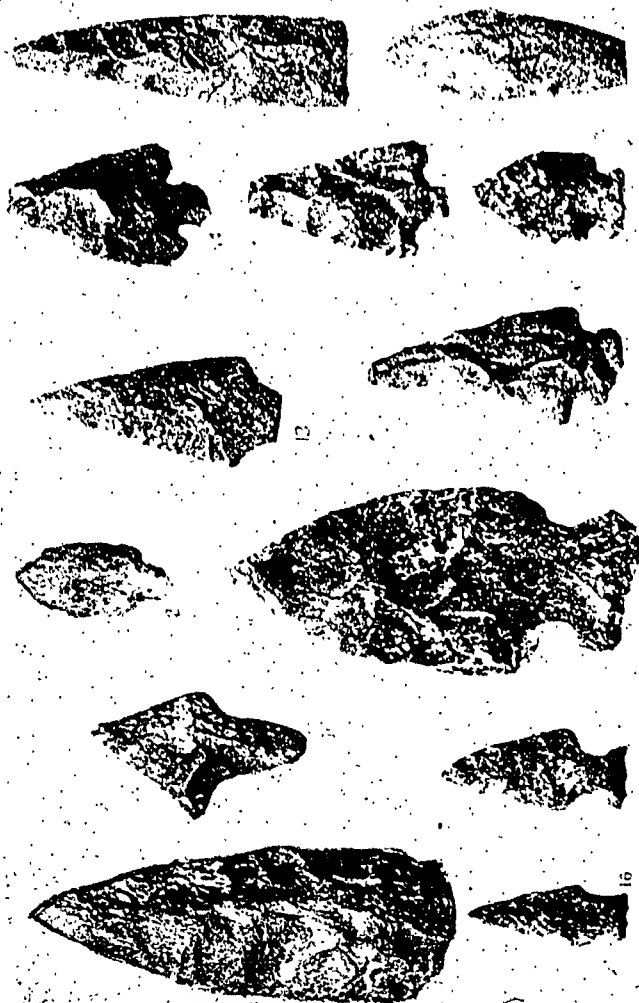


PLATE 6: FROM NOVA SCOTIA SHELL HEAPS. COURTESY NATIONAL MUSEUM, OTTAWA.
FLINT KNIFE AND VARIOUS ARROW OR SPEAR HEADS

to make them smooth and round and grinding them to a very sharp point. But in some cases a bone with a nice little joint for a handle is simply ground to a sharp point and makes a beautiful little awl with half the trouble. Study the pictures and you will find a picture of this adaptation along with pictures of most of the things mentioned in the preceding and later paragraphs.

We find here, the same as among all aborigines, the world over, the custom of using the perforated teeth of carnivorous and other large animals as ornaments, either in necklaces or as pendants. We are not sure whether this is because they think them to be pretty objects ready made and easily perforated or whether the idea behind it is to show their bravery and prowess in killing these fierce, dangerous animals. This would be in line with some warlike tribes who used to keep the scalps of their enemies. Some white men also use the bulbous teeth of the elk, highly-colored and finely polished, as ornamental badges of their society.

The teeth of beavers, porcupines and other rodent animals are found mounted in horn handles and used for carving and cutting (see illustration).

A number of quartzite pebbles of flat, round or oval shape show by their abraded edges at one or more points that they have

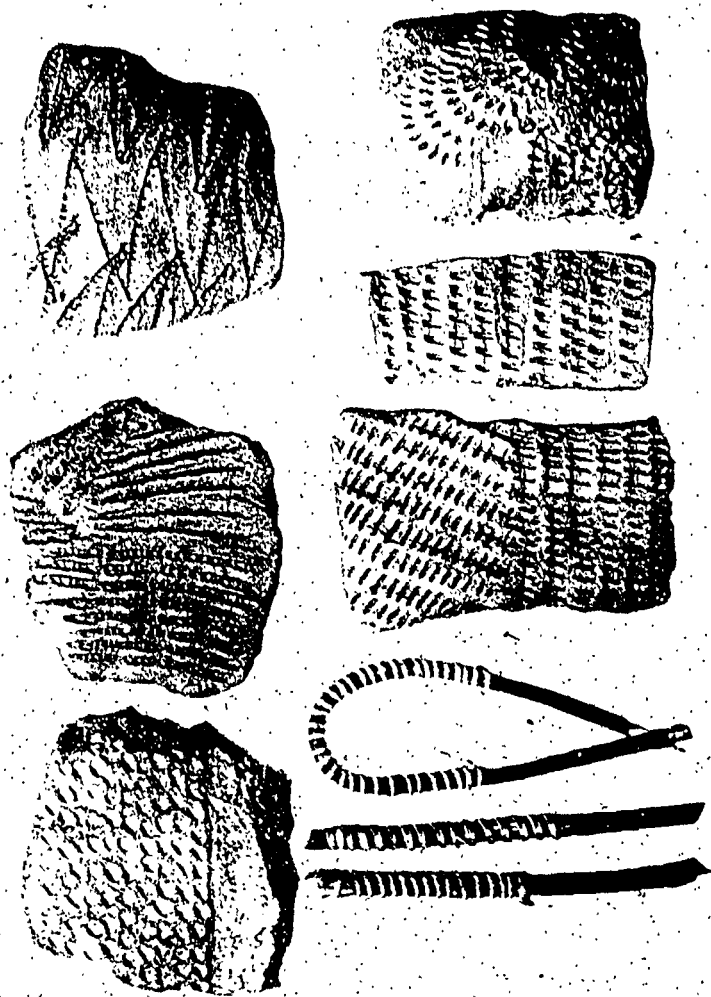


PLATE 7: POTTERY AND MARKERS FROM SHELL HEAPS OF NOVA SCOTIA. COURTESY OF NATIONAL MUSEUM, OTTAWA

been used as chipping hammers to flake into shape the flint and stone arrow heads, knives, and scrapers found here.

The middens or shell heaps are preponderantly composed of shells but they also contain bones of various animals, birds and fishes mixed with decayed branches and soil and containing bone, stone and deerhorn artifacts and pottery sherds.

Much of the pottery found in the Nova Scotia middens is crude and plain with little or no decoration. Some of it, however, had rather pretty cord ornaments made by pressing into the soft clay of the vessel a twig wound spirally with a hard sinew. If the twig is small and the winding close together, and if it is pressed far enough into the clay it produces an impression just like a cord. But if the twig is a little larger and the winding farther apart, and if in this case it is not pressed so deeply it produces the effect of a number of short cross markings in a row. If this kind of a marker is bent into a loop, a succession of concentric circular cord markings can be made. Another decoration found on some of the pottery is rather unique and as far as I know is not found in any other of the middens. It consists of rows of impressions made by pressing into the clay the flat end of a small round stick. Our illustration shows six samples of pottery with these various markings and three markers. Farther on the

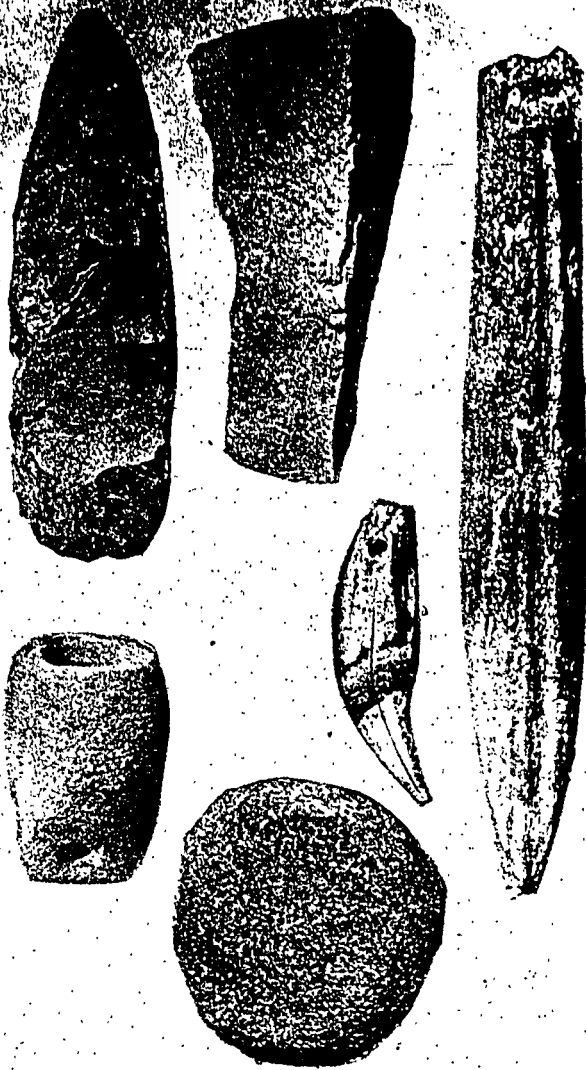


PLATE 8: NOVA SCOTIA SHELL HEAPS. 1. FLINT KNIFE 2. STONE ADZE
 3. IVORY TOOL 4. STONE PIPE 5. PERFORATED BEAR'S TOOTH
 6. CHIPPING HAMMER. ADZE REDUCED, COURTESY
 NATIONAL MUSEUM, OTTAWA.

reader will find it interesting to compare these with the pottery and markers of the Saskatchewan middens. He will find the cord ornaments used there also, although they have others of an entirely different kind.

A few celts are found, mostly rather obscure, and a few adzes which though rather rough and not very finely finished, are still quite effective tools. A fairly good double bitted celt is shown in Plate 9 and with it are shown two nicely-shaped objects made of slate which look as though they were intended to be rubbed smooth and polished to make gorgets. As far as I know no finished gorgets have been found in these shell heaps but many tribes use them. They usually have two holes bored in them so that they may be attached to the person. Some think that they are not merely ornamental but are attached to the wrist as a protection against the recoil of the bow string when an arrow is shot from the bow. A friend of mine gave me a demonstration of his archery and I noticed that his wrist was quite red and grazed.

In the middens there is nothing which could be attributed to contact with the white people. It is true that on top of some of the heaps there are glass bottles and objects made of iron, but these have evidently been dropped there in modern times and are not really a part of the midden.

One curious fact about the pottery of the shell middens of Nova Scotia is that several pointed bottoms of jars have been found, showing that in this regard they are similar to those of the Danish kitchen middens. See plate 4.

One specimen has been found of a stone pipe which consists merely of the bowl with a hole at the bottom for the insertion of a wooden stem.

It is worthy of note that no ancient stone pipes are found in Europe. This of course is due to the fact that tobacco was not used in Europe till Sir Walter Raleigh brought it from Virginia in 1584.

The Indians still living on some of the islands belong to the Mic Mac tribe, a branch of the Algonkian race which occupied such a large territory in Eastern Canada and the New England States. These shell heaps are thought to have been inhabited by the ancestors of the Mic Macs.

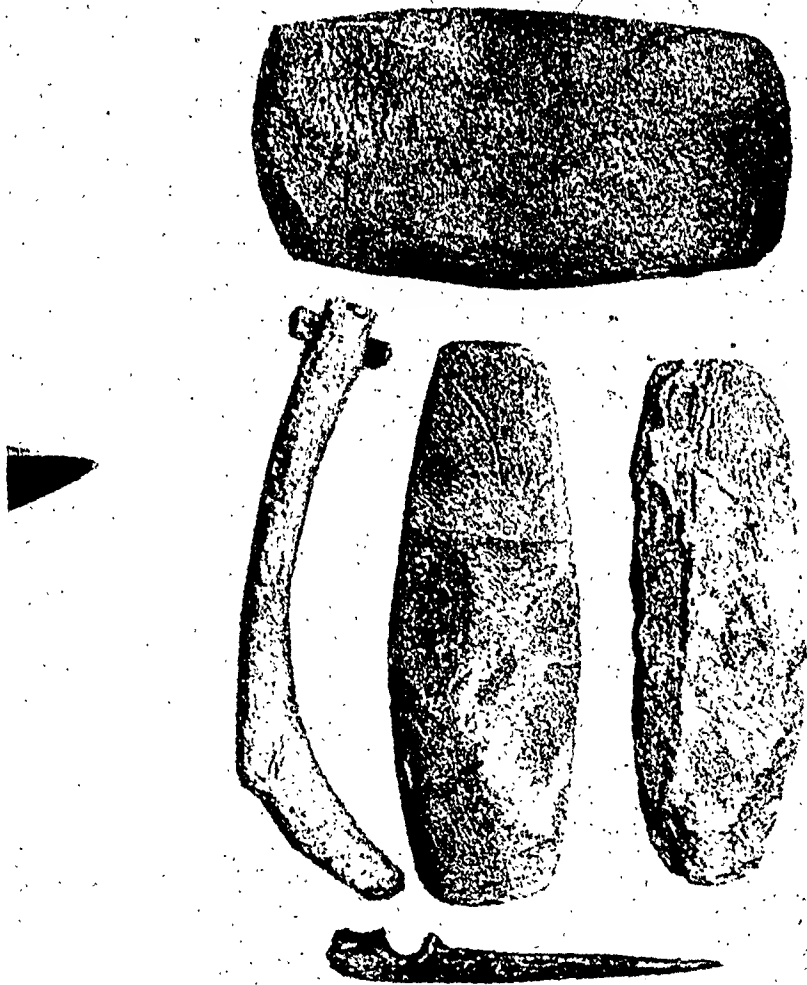


PLATE 9: FROM NOVA SCOTIA SHELL HEAPS. 1. DOUBLE
BITTED CELT. 2. BEAVER TOOTH MOUNTED IN DEER-
HORN. 3. 4. GORGETS. 5. BONE AWL.
COURTESY NATIONAL MUSEUM, OTTAWA.

The Great Fraser Midden

About the middle of the eighteenth century the great Samuel Johnson in a speech in London made the following statement: "All we can know about ancient peoples is what the ancient writers have told us about them." He was quite unaware that close to the spot where he stood an ancient flint tool was dug up, which scientists now tell us was made fifty thousand years ago, before the art of writing had been invented. Of course in the case of King Tutankhamen Mr. Johnson's remark held good, for as soon as his tomb was discovered scholars could refer to writings on clay tablets or monuments, or possibly on papyrus or parchment and could read all about "Old King Tut", who his parents were, how long he reigned, who his wife was and what religion he imposed upon his people.

However, about forty-five years ago a great discovery was made at the Pacific coast at the point now occupied by the town of Marpole, a suburb of Vancouver. A new road was being put through on what is now Marine Drive and as they approached the Fraser River they came



PLATE 10 MOUND IN GREAT FRASER MIDDEN. COURTESY MR. MENZIES
AND VANCOUVER MUSEUM.

to a considerable mound which had to be cut through. As they dug into the mound they discovered a number of human skeletons embedded in an accumulation of rubbish composed mainly of shells of various kinds of molluscs and bones of various animals, with here and there beautiful little tools made of bone, deerhorn, jade or flint. Here was indisputable evidence of the existence, for a long period of time, of a large number of primitive people, for the site, on further examination, was found to cover about four and a half acres and the deposit was covered by about two or three feet of top soil, while underneath this the deposit was in some cases fifteen feet deep, thus making a total depth below the present surface of the ground of about eighteen feet. Of course, it varied somewhat in different parts but the average depth has been estimated at five feet for the whole midden. This aggregation of human relics has been named the Great Fraser Midden.

Who were these people? Where are the writings to tell us about them? They have vanished from the earth and the only record of them consists in the things found in this prehistoric site. We just have to act the part of Sherlock Holmes and patch up our information from many little items or as my old science teacher used to say to us, "throw yourselves on general principles."

One of the first things an inquiring person would ask is "How long ago is it since these people began to live on this site?" If we look at the surface of this ground on the site of this great midden we shall see that on the mound and on other parts of this midden great trees have been cut down. Let us look at the stumps. Some of them are more than eight feet in diameter and if we count the annual rings of growth we shall find as many as nine hundred rings in some of them, which means they were nine hundred years old. It will be evident that while this site was covered with a thick coat of shells and tramped over every day by many feet it would be almost impossible for a young tree to grow from seed. In fact, these trees could not get a foothold until the site had been deserted long enough for the rubbish to decay and become incorporated in the soil. The reader will also remember that we stated that the topsoil above the shell deposit is two to three feet in depth. So it will be quite evident that it must have been a long time after the site was abandoned before the trees got started and as some of them were nine hundred years old before they were cut down, and they have been cut for a number of years, we shall be quite safe in saying that it is more than a thousand years since the site was abandoned.

How long was it from the time they started to live on this site before they had to leave it?

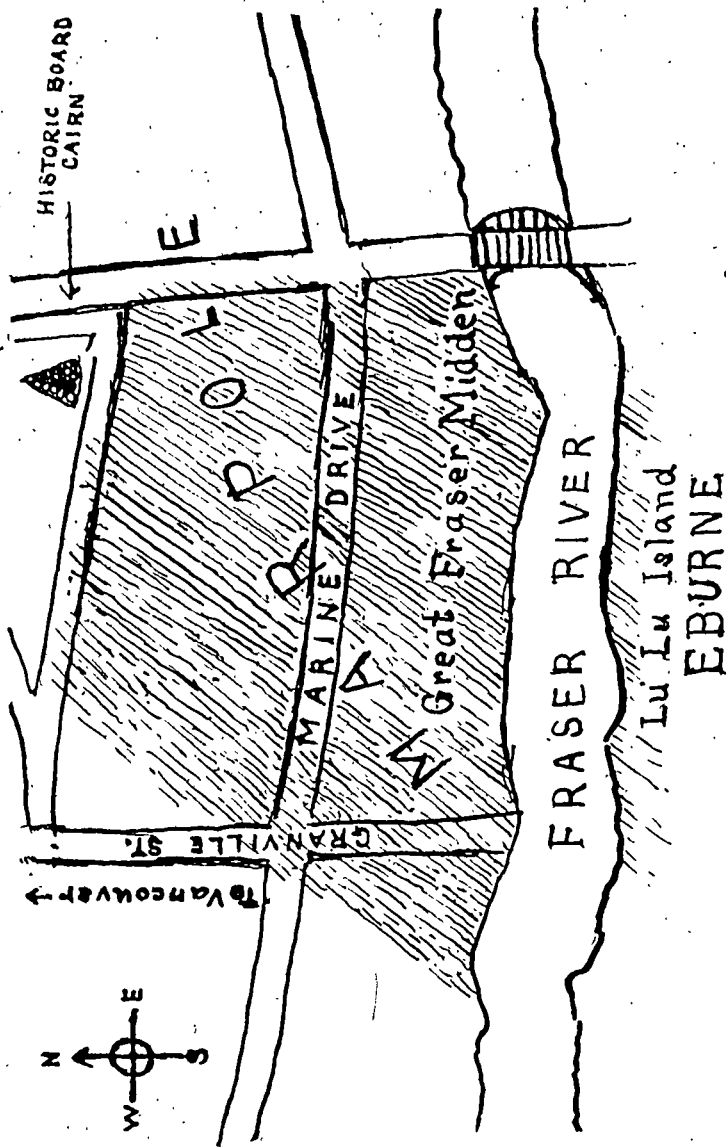


PLATE 11: MAP OF GREAT FRASER MIDDEN AND EBURNE

Well, what have we to tell us about this? The reader will remember that the Danish middens were said to be six or seven thousand years old, and the Great Fraser Midden is twice their size and may have taken as long to accumulate.

Another guide is found in the midden itself. The skeletons found in this midden are of two kinds. Those in the lower parts of the midden all have longheaded skulls while those in the upper levels have shortheaded or roundheaded skulls. The division that scientists make is that if the width of the skull is not more than seventy-five per cent. of its length the skull is longheaded or as they say in their scientific jargon, dolichocephalic. If the diameter is more than seventy-five per cent. of the length it is a broadheaded or roundheaded or brachycephalic skull. The ones in the lower part have a cephalic index of seventy-three or seventy-four while those in the upper or later part of the midden have a cephalic index of eighty to ninety-six.

There is no more certain structural evidence of difference of races than the shape of the skull and we have here pretty clear evidence that this midden was first inhabited by a longheaded race who were exterminated or driven to other parts by a shortheaded race. How long does it take for one race to supersede another and occupy the same land? Probably hundreds of years.

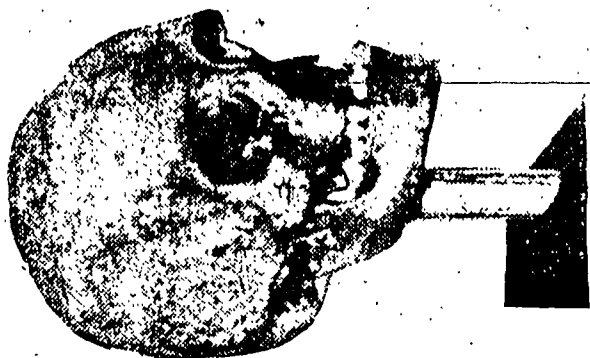


PLATE 12: SHORTHEADED SKULL AND LONGHEADED SKULL FROM GREAT FRASER MIDDEN

Again, why did the second race finally leave this site? Well, why did these people choose to live here in the first place? Mainly because they found here a good source of food. The Fraser River, like all great rivers, carried down in suspension in its waters a great deal of clay, fine sand and silt. In the upper part of its course, where the river was running swiftly, it was able to carry this right along, but when it reached about the same level as the sea at its mouth, and as the river widened and ran more sluggishly, this silt was deposited at the mouth, forming shallow muddy tidal flats on which many species of shell fish flourished. This was the reason why these people came to live here. However, hundreds of years passed and while the people lived here and ate the shell fish, piling up the shells and other rubbish which compose the midden, other changes were taking place in the river. The silt accumulated to such an extent that it piled up and formed two islands covering up a large part of the muddy flats so that they ceased to be a feeding place for so many shell fish. Thus this food supply was cut off and the people probably moved farther up the coast; where many later shell heaps are found.

From a consideration of all these things, namely, the age of the trees, the time required to form the top soil, the time it took to form the islands, and previous to that the time it

took to accumulate the immense amount of rubbish we can see that we are making a very low estimate of the age of these middens when we say about three thousand years. It was about three thousand years ago that the Israelites chose Saul for their first king.

Now let us look at the race affiliations of the two types of people whose remains are found in the midden. The longheaded skulls have rather a narrow forehead but a high, well-developed cranial vault and are especially notable for the high, narrow central ridge passing from end to end of the skull. This is very like the skulls of the modern Eskimos, who have a tradition that their ancestors once lived much farther south than they do now. Moreover, certain stone plates or lamps found in Saskatchewan are very similar to Eskimo work and even in the shell heaps of Nova Scotia suggestions of Eskimo influence are found.

The reader will perhaps remember that in the discussion of the Danish middens I gave a hint of the theory advanced by Prof. Sollas that the Magdalenians may be the ancestors of the Eskimos. In the third revised edition of his book, "Ancient Hunters," Solla's gives a very convincing picture (Page 584) of the Chancelade skull compared with the skull of an Eskimo. They have about the same cephalic index, about seventy-three, both have high heads with prominent central ridges, and both

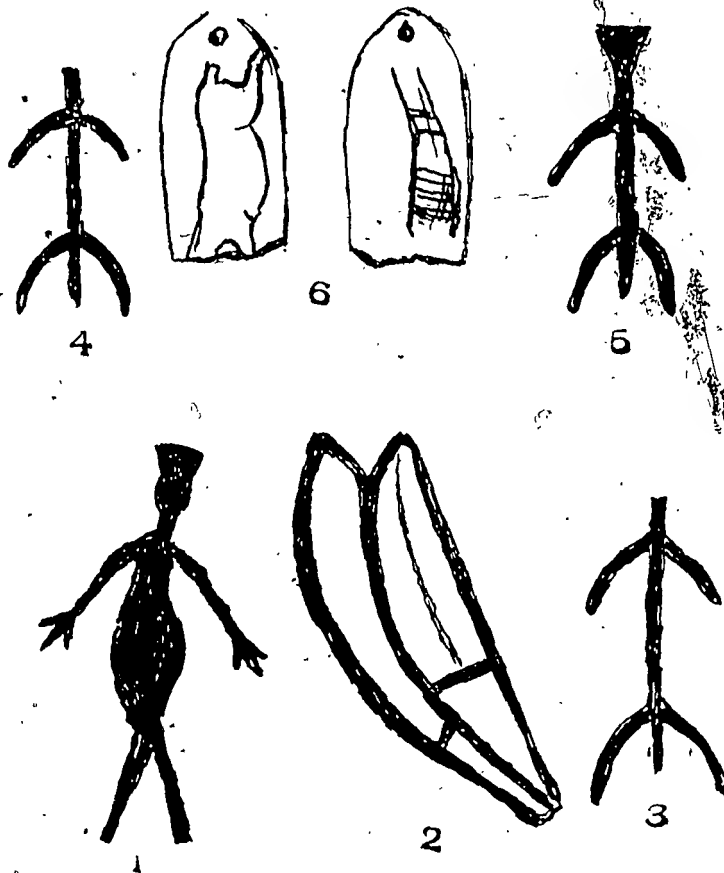


PLATE 13: 1, 2, 3 FROM ROCK PAINTING, SHEFFLEY CREEK, B.C.
4, 5 FROM ROCK PAINTINGS IN SPAIN; 6, MAGDALENIAN PENDANT

have high narrow foreheads. Now the Chancelade skull is well known by its contour, its geological position, and by the animal remains and stone artifacts found with it to be Magdalenian.

One writer comments on the fact that in the Great Fraser Midden there are many more skulls than skeletons. Here again Sollas shows a picture of twenty-seven longheaded skulls found in a nest at Ofnet, with no other bones except a vertebra or two, in an Azilian deposit immediately overlying a Magdalenian deposit. A very interesting question immediately presents itself. Were these lone heads preserved by the friends of the deceased because the head was the most important part of the body or were these heads gathered by enemy head-hunters and buried in a collection? As a teacher tells his class when he doesn't know the answer himself, I would say, "that will be a nice thing for you to find out for yourselves."

Another thing which may throw some light on the question as to whether the Eskimos were ever in British Columbia, and also as to whether the Eskimo were related to the Magdalenians, can be gleaned from certain rock paintings found at various places in British Columbia. For instance a friend of mine at Sheffley Creek sent me a photo of rock paintings found there and later another friend lent me a close-up view of a part of

this same rock. In this part we see a generalized view of a man such as appears in rock paintings in Spain, which are attributed to Capsian or Azilian people. The reader will remember that Capsians, Magdalenians and Azilians were mixed together or influenced the culture of each other just prior to Maglemosean times or the Danish shell middens. The remarkable thing is that in this sketchy figure of a man, as found in the rock paintings of Spain and other places, the head is large and high and has a flat top, as though representing a high cap or head-dress exactly alike in the British Columbia rock paintings and in those of Spain. Furthermore, in another part of both paintings there is another figure of a man, more crude and much more attenuated, and in both cases this second figure has no such notable head-dress and it would almost appear as though the first figure in the British Columbia painting had some clothing on the figure.

In the British Columbia painting, beside the first figure is what looks like an Eskimo sled and Sollas shows an ivory Magdalenian pendant on one side of which is carved an outline of a reindeer running and on the other side of which is carved a sled like an Eskimo sled. We show a cut made from the partial view of the British Columbia rock painting and following it in succession the second crude figure in the same painting, and the two crude figures

from Spain; also the pendant. The reader can form his own conclusions.

The roundheaded skulls in the midden represent a race probably akin to the Salish tribes now inhabiting the surrounding country. The Salish Indians have a tradition that their ancestors came up from the Southeast.

The roundheaded skulls of the midden do not show as fine a development of the part of the brain case that is supposed to represent the intellectual faculties, as the longheads, but the lower back part of these short skulls, which represents the part of the brain controlling the vital functions of breathing, circulation, and reproduction is very largely developed. This is not the only case where a mild intellectual people have been overrun by a physically stronger race who are concerned more about the material things of life.

Now if we are going to find out much about the life of the midden people by the Sherlock Holmes method, let us look at some more of the things found in the midden. About half way down in the shell deposit of the biggest mound, under about seven feet of rubbish, under one of the biggest and oldest of the great trees and with about two or three feet of topsoil overlying the deposit and supporting the tree, there was found a small stone image about a foot in height, seated on a pyramidal cairn built up of small round stones. This cairn with

its contents crumbled down as soon as disturbed, but the image is preserved intact in the Vancouver City Museum.

We insert here a picture of this image carved out of stone. It is very crude and poorly finished and yet it seems to resemble in general



PLATE 14: STONE IMAGE FROM GREAT FRASER MIDDEN.

design some of the vessels of soapstone found in the surrounding country. They all represent a human figure seated and holding in its arms or on its lap a hollow vessel or container. If all these images represent a deity, the idea behind them must be one of two things; either this deity is beneficent and is holding out to his people a vessel filled with gifts for them or he is more selfish and is holding out a vessel to receive the gifts, offerings or oblations which he demands of them. All these figures are grotesque, but this is made of rougher stone and so indefinite in shape that the photographer had to whiten certain edges in order that the main features may be evident in the photograph.

From the fact that the cairn on which this figure was seated goes deep into the lower levels of the midden mass we might conclude that this cairn and image were set up by the longheaded race and that it was gradually covered up by the rubbish deposited by the conquering race that succeeded them. Moreover the extra depth of the mound just here might be due to this having been a gathering place around the image.

Now let us look at some of the small things found in the Midden. Here are some beautifully-made bone needles. Needles indicate sewing for garments. What material would they sew for clothing? Following the analogy



PLATE 15: FROM GREAT FRASER MIDDEN, COURTESY
 VANCOUVER MUSEUM. 1. JADE CELT. 2. FLINT
 KNIFE OR DAGGER. 3. PERF. TOOTH. 4. BEAD.
 5-9 ARROWS.

of primitive tribes in all parts of the world it would be almost certainly hides of animals. To get these they would need weapons for killing the animals and here we have sharp arrow and spear heads of flint.' The wooden bows will have crumbled to dust. Next we find sharp flint knives to cut the hide and the celts made of jade, jadeite or other stone are the finest tools to strip the hide off an animal, as they separate the hide from the flesh without cutting either one.

As a needle is difficult to push through a tough hide we find awls with sharp points and larger handles to make the holes for the needle. These awls are made by cutting strips from a large bone and rubbing them on sandstone to make them round and sharpen and polish them.

Some of the awls have an eye near the point. I presume some inventive fellow said, "Why use two tools when one would answer the purpose? If an eye were put in the awl the thread would be pushed through at the same time you made the hole." Evidently this man had in embryo the principle of the modern sewing machine.

Most of the needles are of the usual type with the eye at the base, but we find some here with the eye in the middle and pointed at both ends. I venture to suggest that these are not needles at all. They are more probably a gorge, which was used by the early people of Europe.

A line is attached to the eye in the centre of this little bone implement. Then a tough piece of meat or other bait is put on one sharp end. This of course makes it hang straight down as it is lowered into the water. A greedy fish with a big mouth comes along and swallows the whole thing. As he turns to go away the jerk on the line causes the bone to turn sideways in his gullet and he is hooked as securely as he would be with a modern steel fishhook.

Before we leave the needles we might mention a kindred tool which is wider and flatter than the needle and has a long narrow slit in place of an eye. This no doubt is a bodkin for pushing a ribbon of hide through a prepared slot.

The celts (chisel stones) found here are very remarkable in one respect. Most of the celts found on the prairies or in Ontario have been made from stones which naturally broke in a long shape. They have been rounded or improved in shape by pecking with a hard, sharp stone and then finished by rubbing on sandstone to sharpen and polish them. Sometimes they are polished all over but in many cases the grinding and polishing are just at the cutting edge.

The celts in the great Fraser Midden have been cut from a block of jade or other fine stone by sawing with the sharp, jagged edge of a piece of quartzite or other very hard stone.

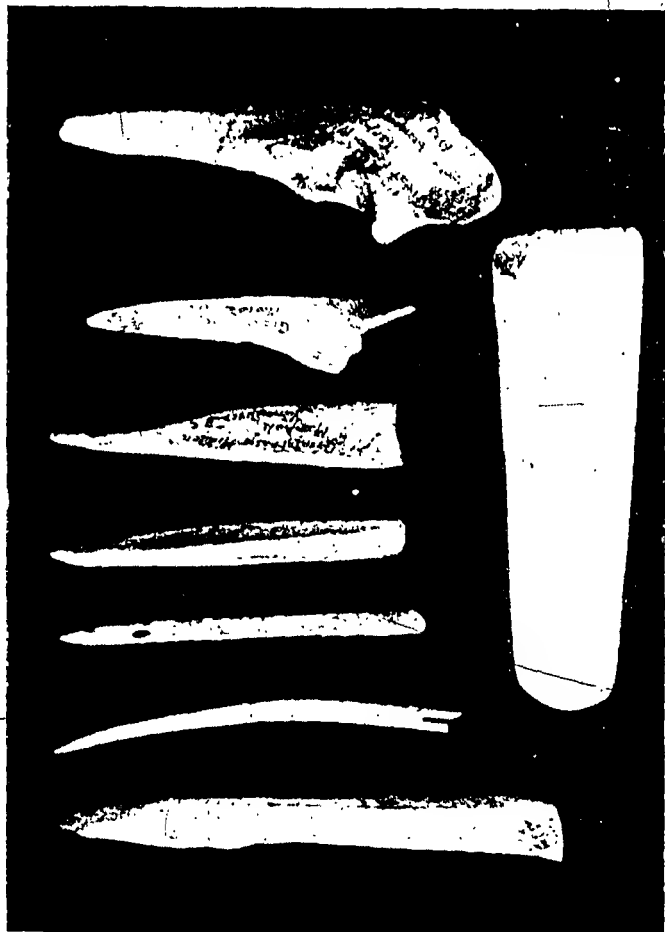


PLATE 16: TOOLS FROM GREAT FRASER MIDDEN, COURTESY OF MR. MENZIES OF VANCOUVER MUSEUM. IVORY NEEDLE, AWL WITH EYE, AND LARGE CHISEL OF DEERHORN, MUCH REDUCED

This of course keeps the side edges straight from the beginning and you can usually see remains of the groove at the side where it was cut from the block. A good deal of the jade is translucent and will take a high polish and is of a pretty green color, so that these celts are "things of beauty" and "a joy forever," to the heart of an ardent collector, as well as to the maker. Many of the celts have a cutting edge at each end and are like a small, double bitted axe. A few have been mounted in deerhorn sockets, as in the Danish middens. Blocks of jade have been found partially cut, with the cutting tool near by.

There are a number of fine flint knives which are like an elongated arrow-head but having no notches. Some of these are thought to have been mounted in handles to make a dagger. The later neolithic flint daggers of Denmark are marvels of flint chipping and they have the handle chipped all in the same piece with the blade.

Some of the arrow points found here are triangular, which is like some in the Saskatchewan middens but the majority of the arrows and spear points are larger than in the Saskatchewan middens. Some are leaf shaped and a few are like a long willow leaf cut straight across at the bottom. Some have square bases with no notches, like the Yuma type. Others narrow down to a small stem and many are

like the ordinary arrow, such as are found all over the continent.

Perhaps the most beautiful of the artifacts and the ones most difficult to make are the harpoons made from bone or deerhorn. We cannot but admire the skill and perseverance of these people who with few primitive stone tools were able to cut from large bones, strips which they fashioned into the delicate and beautiful forms shown in plate 17.

The harpoons have sharp symmetrical barbs evenly spaced down one side and the basal end is carefully shaped for attachment to a shaft. The barbs vary in number from one to a dozen or more. Any reader who will take a piece of flint or a pocket knife and try to make even a small mark on one of these hard bones will realize what a long-continued effort it would require to cut these things into shape and rub them smooth. We would find it a difficult task with saws and files.

Because of their beauty and frailty, and the difficulty of replacing them, none of them except the larger, coarser, stronger ones would be used for hunting land animals. Their main use would be for spearing fish and if the salmon came up the river in thousands as they do now, the salmon-spearing season would be a busy time. It is not improbable that they had discovered a way of preserving them by drying and smoking them, or by the use of salt.

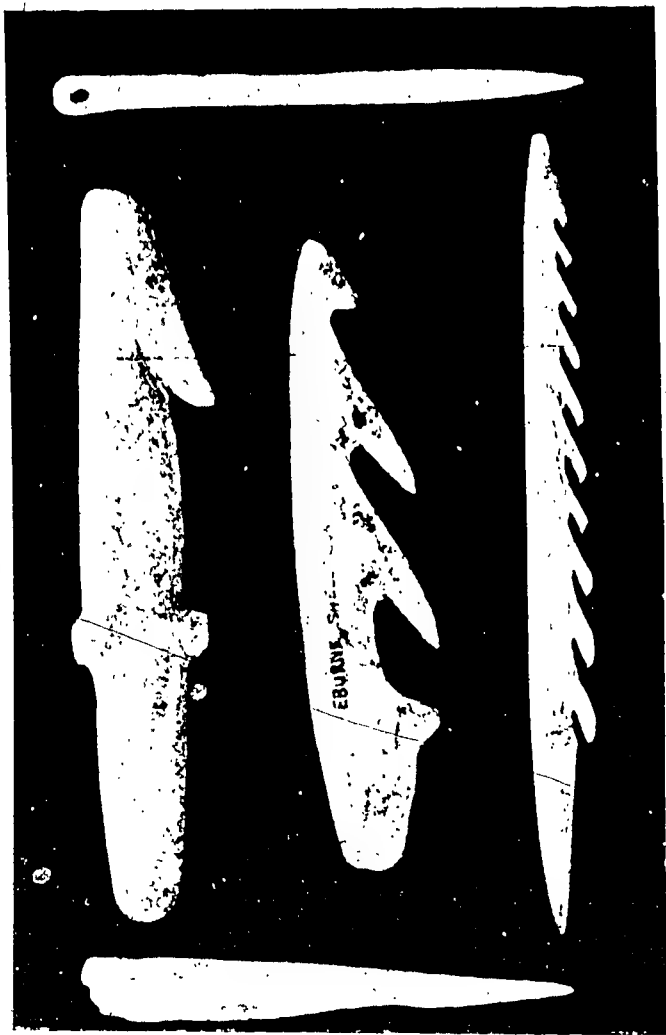


PLATE 17. THREE HARPOONS, A NEEDLE AND AN AWL FROM GREAT FRASER MIDDEN. SCALE 3/4.

One very important piece of information is furnished by one of the shortheaded skulls of the midden, in the fact that two round pieces have been cut out of this skull similar to the modern operation of trepanning. One thing is sure, the operator would not have anaesthetics, antiseptics, or modern steel instruments. Nothing but a sharp flint. I am



PLATE 17-A: TREPANNED SKULL

not so sure that he might not have had something corresponding to penicillin for I have read that the Chinese used what was practically the same thing ages ago. However, the first operation was successful, as shown by the

healing of the edges of the bone. The second opening did not heal, the presumption being that the patient did not live long enough for this to take place. The reason for his death may have been that the second opening was too close to the part of the brain which controls the vital functions of breathing and circulation.

A very remarkable coincidence in this connection is that the two-faced double stone head of the "Saskatchewan Janus" mentioned and illustrated in "The Stone Age on the Prairies," has a round, shallow depression carved into the top of one of the heads which seems to show that the maker of this image knew about the operation of trepanning.

While no pottery vessels or sherds are found in the British Columbia shell heaps, a wealth of stone vessels carved from soapstone and a few of sandstone or grit stone are found, not only in the midden but also in the surrounding country, as far east as Kamloops. Most of them are designed as mortars and while a few of them are plain or tastefully adorned with conventional designs, the majority have carved figures of men or animals and are quite grotesque. One of the least barbaric, which was found across the river from the Great Fraser Midden at Eburne on Lulu Island is shown in plate 20, together with a number of pestles.

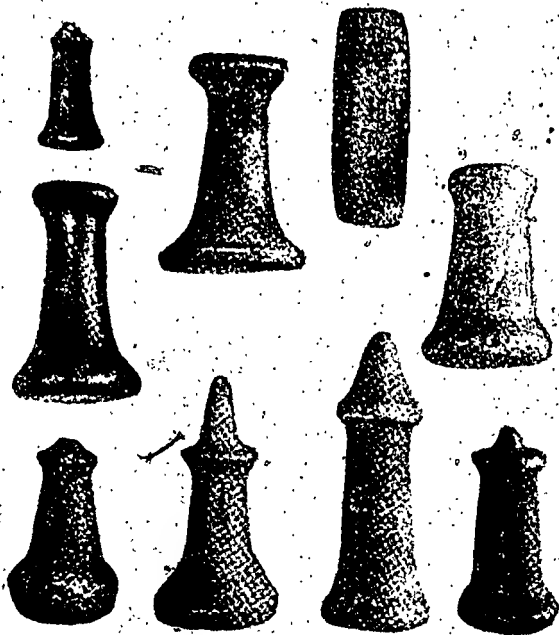
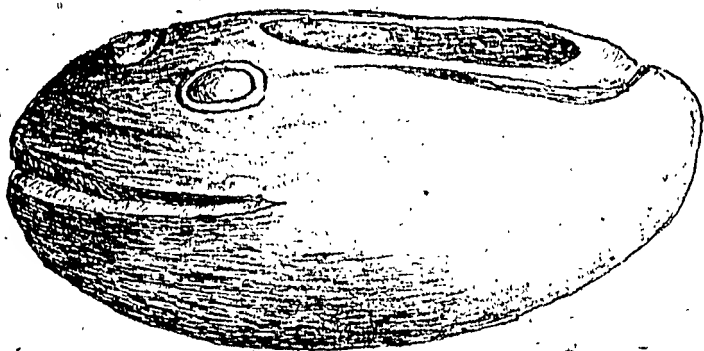


PLATE 18: MORTAR FROM EBURNE. PESTLES FROM MARPOLE. EBURNE
AND SURROUNDING COUNTRY.

Many smoothly-made pestles of graceful form are found in the midden and in the surrounding country but in the lower, earlier part of the midden the pestles are not well made, in fact, most of them are just stones which were naturally long-shaped and suitable for use as a pounder.

The midden people were not devoid of ornaments, for we find flat beads made by cutting a small disc from a clam shell and drilling a hole through the centre. There are also necklaces of perforated teeth and claws, and strings of wampum.

So far as I know, no indication has been found of a house or permanent dwelling. The probability is that they used skin tents and no doubt the majority of them lived a fairly happy, healthy, contented life. In a few years the memory of them will have perished from the earth, except as it is kept alive by the specimens in the museum and writings which get out of print and disappear. It is to keep these memories for future generations that we establish and maintain our museums, and all intelligent people should help to maintain these institutions. To my mind it is just as worthy of our attention to know how our early ancestors, or human predecessors, gradually climbed from savagery to civilization; as it is to recall how the barons made King John sign the Magna Charta, or how Henry VIII married eight wives



PLATE 19: PREHISTORIC HABITATION TWO PERBISTED TILL THE NINETIES

and established a new church to sanction his marriages and divorces or executions.

Although, as stated in the preceding paragraph, no indications of a form of residence are found in the Great Fraser Midden, yet a study of a form of residence which at one time was found in the surrounding country but which has now practically disappeared would seem to add plausibility to the two theories advanced in an earlier paragraph, namely: first, that the people represented by the long-headed skulls of the midden were the Eskimo; second, that the Eskimo are descendants of the Magdalenians of Europe. A fine description and illustrations of this kind of residence is given in a publication of the National Museum at Ottawa, written by Harlan I. Smith. By courtesy of the National Museum I give this description in the words of Mr. Smith, which are hard to improve upon, and reproduce an illustration and a diagram from that work. I insert also, for comparison, a copy of wall paintings from a Magdalenian cave, in Europe, this being taken from Prof. Sollas' book, "Ancient Hunters". These are shown in plates 19 and 20, and I quote verbatim from Mr. Smith as follows:

"Until recently the Thompson River Indian built his home partly underground. He dug a hole from ten to thirty feet in diameter, upon the edge of which he rested a roof that covered

the entire excavation. An opening was left in the top which served as doorway, window and chimney. The Indians entered and left the house by means of a curious ladder made of a notched log."

Two of these habitations still existed in 1897, though they were fast going to ruin. One of these is shown in plate VI. (Our plates are Nos. 19 and 20).

"On all the old village sites are found numbers of circular depressions ten to thirty feet in diameter and two to five feet deep. Each is surrounded by a ridge of earth. Excavations in these show that the fire-place was near the centre of the house. It would seem that these depressions are the remains of winter houses similar to those of the modern Indians. We consequently conclude that the summer and winter habitations of both the prehistoric and the present-day Indians were practically the same."

I might say here that Mr. W. J. McDonald of Yorkton showed me some of these same depressions surrounded by a ridge of earth and containing fire-places in the sand dunes north-east of Yorkton, getting up towards Veregin. No vestiges of the wood-work were left.

In the diagram, plate 20, Mr. Smith shows the general plan of one of these houses with the log deeply notched for a ladder. The part

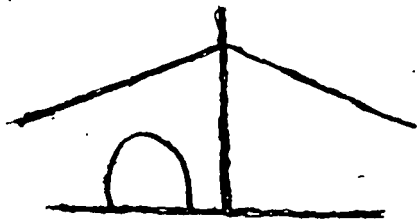
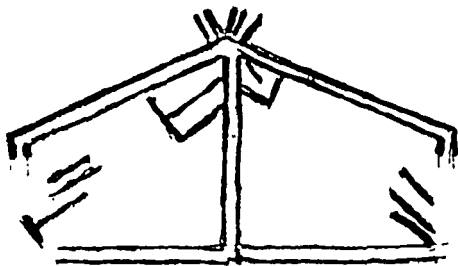
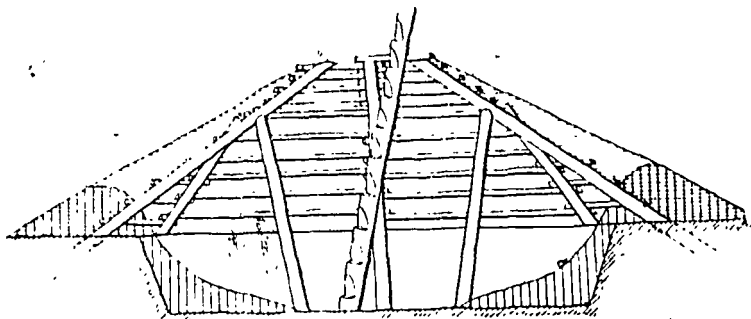


PLATE 20. DIAGRAM OF SEMI-SUBTERRANEAN HABITATION, BRITISH COLUMBIA. TWO DRAWINGS FROM MAGDALENIAN CAVE OF FONT-DE-GAUME.

shaded with horizontal lines shows the earth piled up on the roof. The part shaded with vertical lines shows the same earth after the collapse of the building part of it, forming a ridge around the excavation and part of it sloping down the sides of the excavation, which is just the way the prehistoric ones appear.

Below Mr. Smith's diagram we insert a copy from Sollas of two drawings from the walls of the Magdalenian cave of Font-de-Gaume, which have a striking though rude resemblance to that of Mr. Smith, even to the ladder projecting from the roof. This would seem to indicate that the Magdalenians in France used a similar form of residence to those found in British Columbia and Saskatchewan. The reader will observe that in both drawings from Font-de-Gaume no support is shown for the rafters, the supposition being that they rested on the earth at the edge of the depression.

This may seem a little far-fetched, but if we follow the Sherlock Holmes method, this might be a clue. In fact, we are rather like a little boy who longed to be a detective but he didn't know how to get "baffled" as all great detectives do.

Japanese Shell Heaps

Away across the Pacific Ocean from Vancouver a shell heap stage of culture similar to that of the west coast of Canada has existed in Japan. A necessary condition for the carrying on of such a life as that represented by the shell heaps is that there shall be shallow water along the coast or at least in certain bays or deltas which will form breeding places for various kinds of shell fish, such as oysters, mussels, clams, etc., and thus provide large quantities of nutritious food which will be easily accessible to a primitive people who have not yet developed a better way of getting a living. While this has been a main article of diet here, as in many other parts of the world, it would no doubt be supplemented by many items of vegetable food such as various tubers, many kinds of fruits and nuts which would be peculiar to that country and would be unknown to us. Also to judge by the bones found in these middens, such as those of the deer, the wild boar, the bear, the fox and other animals and birds, they must have done considerable hunting to provide meat and skins. At any rate, large numbers of chipped arrow and spear

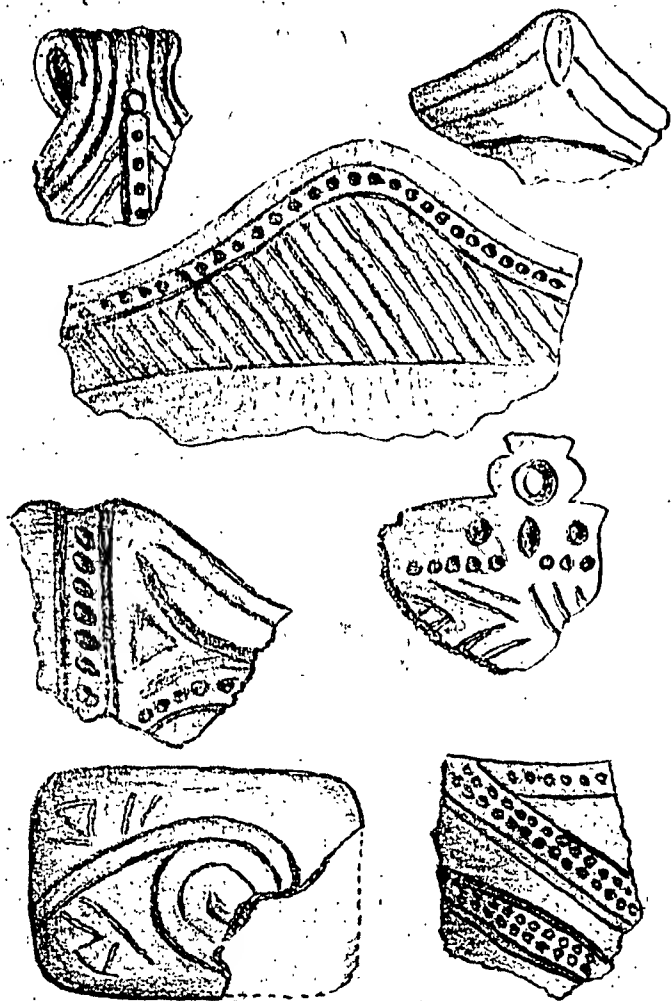


PLATE 21: POTTERY FROM JAPANESE SHELL HEAPS AT OMORI.

heads are found and as the Japan islands are purely of volcanic origin we are not surprised to find that there, weapons are made of volcanic rocks chiefly of obsidian. Obsidian is rather rare in the great prairie regions of Canada and the United States, and what little there is has been brought there either in the form of artifacts or in lumps of raw material. But in the Western United States, in Mexico and Peru, in South Africa and generally in all mountainous countries, where volcanoes have existed it is plentiful and as it is very easily chipped and makes most beautiful artifacts we can not be surprised that in all these places it is the predominant material for artifacts.

The arrow heads of the Japanese middens are usually of the hollow, or incurved base type.

Among the debris of the middens many fragments of pottery are found which would suggest that they may have learned to cook their food.

The pottery has quite artistic decorations which are similar to the patterns still found among the Ainus, in their wood carving and dress ornamentations. In plate 21 we show some samples of pottery found in the shell mounds at Omori, Japan, which are probably typical of that found in other parts. Notice the handles on the vessels. All of these shown are reduced in size except the small tablet in

the lower left corner which is natural size. The Ainus were the first inhabitants of Japan of whom we have any knowledge.

The present ruling race of Japan came over from the mainland to the island of Kyushiu several hundred years before the Christian era. They were at that time in the stage of culture generally referred to as the bronze age and had some use of metals. Their pottery is quite different to that found in the earlier middens. Just as the invaders of Great Britain drove the early Britons into Wales, Cornwall, and Devon, where their descendants still live and are easily recognized by the shape of their heads, the color and characteristics of their hair, etc., so in Japan the advanced conquering race drove the aboriginal Ainus farther and farther north until they are now confined to the northern islands of Yezo and Saghalien, where they are easily recognized as a separate race.

This of course led to the abandonment of the earlier middens at the South and the formation of others successively later as they retreated north.

Progress can be noted in the later middens for we find them beginning to verge toward more characteristic Neolithic artifacts. For instance, we begin to find the celt in the later middens and here, as in Scandinavian countries, some of them would have a round cross-

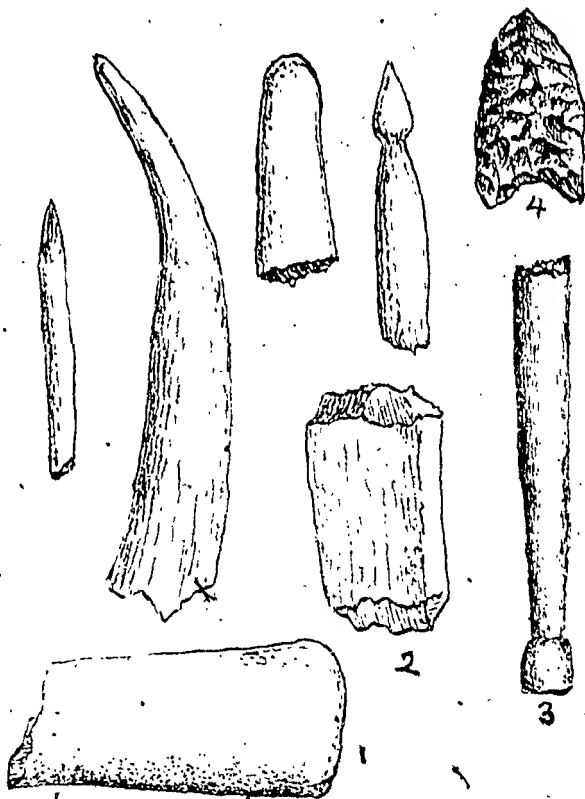


PLATE 22 FROM SHELL HEAPS AT OMORI, JAPAN 1, 2, AND 3
OF STONE 3 THUNDER MALLET. 4. OBRIDIAN ARROW. THE
REMAINDER ARE OF HORN OR BONE. MALLET MUCH
REDUCED.

section while others would have an oblong section.

In the earlier middens we find many objects made of deerhorn and bone as well as some of stone. We are rather short in information and material for illustration but the little we have is suggestive of much more. We present a few things found in the shell heaps at Omori. The articles made of bone and horn suggest awls, needles, etc. The articles are not all drawn to the same scale. The broken stone club shown is typical of a number found elsewhere. The modern Japanese speak of these as thunder mallets and they are supposed to be symbols of authority. When you read of thunder mallets in Japan and the hammer of Thor in the Scandinavian countries of Europe and the "baton de commandement" of France, it sets you wondering about many things. At any rate, one tap from the thunder mallet in the hand of a sturdy chieftain would be apt to prevent further insubordination on the part of the one thus reproved.

Some peculiar-shaped chipped knives are found which strongly remind us of the corner tang, back tang and basal tang artifacts of Texas. A few of these are found in Saskatchewan, along with six or seven other variations and to avoid complexity of names we call them all oblique knives. The cutting edge of these Japanese knives is more incurved



PLATE 23: PECULIAR FLINT KNIVES FROM SHELL HEAPS AT OMORI, JAPAN.
BRITISH MUSEUM GUIDE

and more steeply bevelled than either those in Saskatchewan or Texas.

Thus far, all the middens discussed have been shell heaps, and similar circumstances have produced aggregations of cultural remains which have many points of similarity, although differences of climate, race and material surroundings cause local differences to appear. We shall now proceed to discuss other middens which on account of their location at a distance from the sea, and also on account of the background of the race that inhabited them, show a considerable divergence in the type of artifacts which they display.

Saskatchewan Middens

The Saskatchewan collectors and students of archaeology have been reading for some years about kitchen middens in Denmark, in Nova Scotia, and in Vancouver, and our hearts were filled with envy. Why should we be denied the joy of having middens of our own to investigate? Of course, we thought, middens are shell heaps and how could we have shell heaps in the middle of a great continent? So with a sigh we resigned ourselves to this inevitable deprivation. But suddenly we were amazed to find that we have two fine extensive middens of our own. Not shell heaps, for it has also dawned upon us that while all shell heaps are middens, yet all middens are not shell heaps, and ours are very largely composed of bones. But as explained in our discussion of the old original middens in Denmark, any heap of refuse left on campsites of prehistoric peoples which furnish evidence of the way of life of the vanished inhabitants thereof may properly be called middens. And with all my study of Professor Sollas' book, "Ancient Hunters", I had failed to take in the fact that in speaking of the camp at Solutre, 'littered

PLATE 24: GENERAL VIEW OF STONY BEACH MIDDEN LOOKING EAST TO TOP



with the bones of thousands of a primitive type of horse consumed by the Solutreans, he calls it a midden. And of course it would be a bone midden like ours and would contain Solutrean tools, the best and most characteristic of which were the beautifully-chipped willow leaf spear points.

Many men of the present pushing business age look with tolerant contempt on those who spend their leisure time collecting and studying relics of the races who once occupied this great land and who are now passed away. They for their part would sooner knock a ball around a field and walk after it or fit themselves out with hunting togs, gun and ammunition and have a good day of slaughtering beautiful creatures, not because they need them for food but just for the pleasure of killing.

A few men of this province who are not by any means "slothful in business" are yet "fervent in spirit" in searching for the underlying causes, some of them reaching far back into the distant past, which forced the various races to live in a certain way and at a certain place and time. Why, for instance, are these great plains covered today by a host of wheat farmers? Simply because about thirty thousand years ago, the hand of God, working through natural causes, spread the whole surface of this country with fertile soil manufactured and distributed by the great ice sheet

which passed over all of this land. Perhaps no other phenomenon of nature had so great an effect on the topography of this country, on the flora and fauna and directly or indirectly on the habitat and mode of life of the various races which have succeeded each other.

How did this glacial period come on and had it anything to do with these middens? The glacial period was caused by a change in the angle of the axis of the earth. The reader no doubt, when a child, had a little top with a stem which he spun with thumb and finger. While it was spinning it wobbled a little so that the stem pointed in a slightly different direction at various times. The earth is like an immense top spinning on its axis and it too wobbles very slowly. Whereas the top rotates perhaps a hundred times in a minute, and wobbles perhaps ten times in a minute, the earth turns once in twenty-four hours and wobbles perhaps once in twenty thousand years. When the axis of the earth leaned over at a slightly greater angle from the perpendicular it would bring the Arctic Circle farther south from the pole and cause the winters to be longer and colder on this continent.

The great ice sheet of this continent began to form at the west side of Hudson's Bay. When the climate became so cold that the snow of one winter did not all melt before the coming on of the next, the snow began to

accumulate, and by its own weight became compressed into ice. It was demonstrated by Tyndall in his study of the glaciers of the Alps that ice under pressure will change its form by the rearrangement of its molecules until to all intents and purposes it really flows at a very slow rate. Antevs estimates that the height of the glacier west of Hudson's Bay was about eighteen thousand feet and the terrific weight squeezed out the ice sheet radially in all directions, carrying on it or in it boulders of the rocks around Hudson's Bay, and depositing them as far south as the Ohio River and even pushing others up to a height of three thousand feet in the foot-hills of the Rocky Mountains in Southern Alberta and in Northern Montana.



PLATE 25: THE TREASURE HUNT.

The almost incalculable weight of this great ice sheet as it was pushed along with irresistible force enabled it to do terrible things to the surface of the earth over which it passed, especially where it gripped huge fragments of rock torn from its bed and used them as graving tools with which to carve and tear at other bed rocks. In the process both the graving tool and the bed rocks were worn flat and marked with deep scratches. Good examples of these flat, scratched boulders can be seen in many places in the province and they are especially numerous along the shore of Long Lake. Near the town of Young and also at Standing Rock, near Cabri, are boulders larger than a big house. The best example I have seen of bed rock marked in this way was at Nepean Point in the city of Ottawa, where ages ago a glacier had slid over the limestone cliff into the bed of the river.

However, to make a long story short, the general effect was a levelling process by which the valleys were exalted and the mountains were brought low and a large part of the surface was covered by glacial till, that is, clay formed by the pulverizing of the rocks interspersed with boulders, large and small, to a depth of one hundred and fifty feet in many places. In some places there were beds of sand or gravel and in a few places the wind gathered up the rock flour and deposited it in beds of loess.

However, after a few thousand years of ice accumulation the weather began to moderate and as it gradually warmed up, the ice began to melt at the southern edge and the glacier retreated the way it came, probably taking about the same length of time in the retreat as it had done in the advance. Naturally, the melting of such a vast quantity of ice produced a proportionally large volume of water which would be forced to make new drainage paths for itself, seeing that the leveling process mentioned in the preceding paragraph had filled up all the old river beds and valleys. Nearly all of our present valleys and river courses are comparatively new in a geological sense and have been formed in post-glacial times.

By the time the melting of the ice got well under way, these waterways had become large rivers and thousands of years later, as the ice was largely gone and the glacial period neared its close, these large rivers dwindled to small proportions. Thus we find for instance the Moose Jaw Creek, a few yards in width, occupying a noble valley which could and probably did at one time accommodate a river two miles wide.

Naturally there were tributary drainage channels running in at intervals along both sides and while the main stream was edgfull, the slopes of these side river-ways was gentle

and widespread, forming shallow, cosy little valleys. However, as the main river cut its bed deeper and deeper and as the water sank, each side stream entered the valley more precipitously and consequently cut back, forming a ravine. By this time the wider, gentler valleys at the top had become thatched over with a thick growth of tough grass which shed the water and prevented further erosion except lower down, where spring floods were concentrated into a swift-flowing stream, cutting the ravine deeper and deeper.

Now, if the reader will look at plate 24, he will see one of these sheltered little valleys which open out westward into the larger Moose Jaw valley: In the illustration you are looking eastward up the valley toward the top, where a deserted farm house is seen peeping over the rim. If you turn the other way you see the lower part of this little valley becomes a ravine with its sides clothed with bushes and trees descending rather rapidly in a tortuous course until within a half mile or so it reaches the same level as the main valley which is here about one hundred and twenty-five feet deep.

This little valley is the site of the first buried camp site discovered in Saskatchewan, where some unknown people lived for a considerable time, leaving behind them buried in the great accumulation of rubbish, many interesting relics which are absolutely the only

record we have of them and which we are studying, to extract from them all the information possible before they are gone forever. This then, is what the glacial period did for the Midden people: it formed a secluded valley where a peaceful people might live sheltered from the cold winds of winter and hidden from observation by their enemies from the great plains above.

Following the example of the Danish archaeologists, we call this a kitchen midden and because it is nearer to the little village of Stony Beach than to any other place, we refer to it as "The Stony Beach Midden".

The question may arise in some people's minds as to why these people should have chosen this little valley instead of several others which are near by. The answer is that about half way down this valley is a level spot where the ground is wet and where sedges and bulrushes still grow, suggesting that once there was a spring. After the spring ceased to flow, someone, probably the farmer in the house, dug a well here, but it too is dry except in the spring.

Still later and only a few years ago, the owner of this land started to bore a two-foot well higher up at a point near the middle of the picture, near the bushes shown there. This led to the discovery of the midden, for when the boring machine got about two feet down

it ran into a bed of bones about a foot thick and closely packed, and lower down, for two or three feet, more small fragments of bone are mingled with the soil and other rubbish.

Two members of the Archaeological Society were hunting on the fields above the midden for specimens, when one called the other to look at this well. On pulling out some of the large bones, some pieces of prehistoric pottery fell out and a piece of worked flint. On a second visit they got down inside the well which was not deep and pulled out more bones which revealed arrow heads and more pottery.

As soon as this became more widely known a number of people came and by sinking test holes at various places it was discovered that the layer of bones extended at least three hundred yards from the wooded part of the ravine, up toward the top of the valley. The width of the part excavated so far is about thirty yards, but we are still widening it and there may be quite a bit untouched so far. Then down among the bushes in the rougher part of the ravine bones are found and we are not sure whether the deposit extended much farther down but has been partially cut out by spring floods and covered by bushes and trees.

Some ethnologists tell us that the relics found in this midden are just such as were made by the Mandan Indians. If that is the case, they might well seek such a place as this.

The Mandans were of the same racial stock as the Sioux, but for some reason the rest of the Sioux tribes turned against them and drove them north from the Missouri river up through the northern states and finally into Canada, where they penetrated as far as Edmonton.

It is said that the Mandans were much whiter than the other tribes and there is a legend that some generations back a number of Welshmen were driven out to sea and finally got to America where they fraternized with certain tribes of Indians and the Mandans were the mixed offspring. This might account for the paler skin and for the attitude of the darker tribes toward them.

It would be the reverse of the modern attitude to have the dark people showing contempt and resentment against the whites.

Local enthusiasts flocked to this place and began to excavate it systematically, using pick, shovel and screen to sift all that was dug up and make sure that tiny things should not be lost. It was soon ascertained that in addition to numerous fragments of pottery and flint arrow heads there were flint knives and scrapers and an abundance of bone tools nicely made and some engraved and polished.

The use of a hand screen where the operator had to bear the whole weight and where only a small quantity could be put

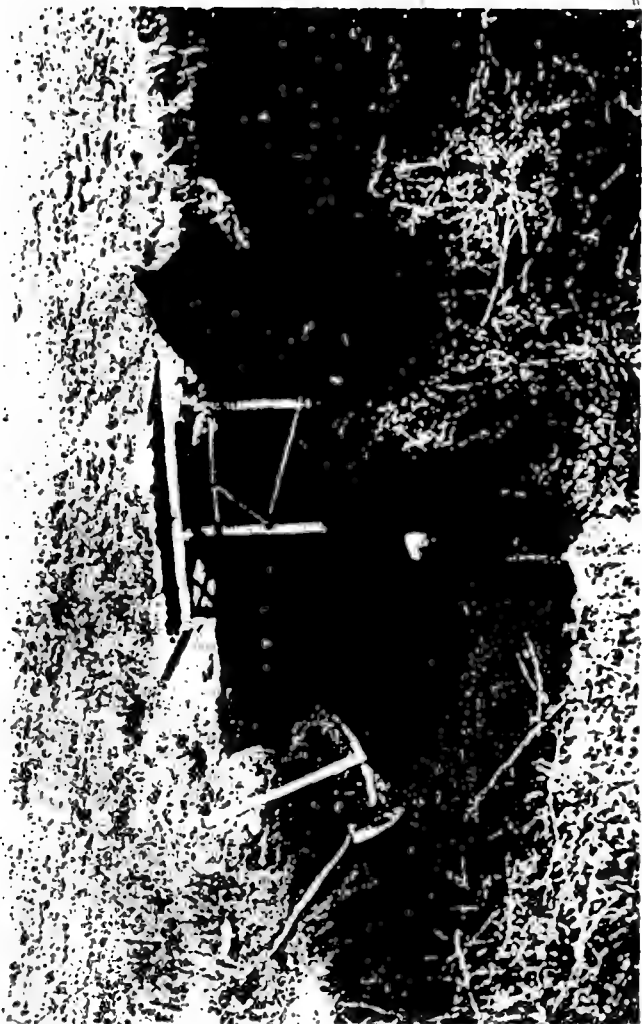


PLATE 26: IMPROVED SCREENING APPARATUS

through at a time was found to be very exhausting and some of our more enterprising young men devised apparatus which enabled them to use a larger screen and at the same time relieved the operator from the hardest part of the work. They procured four pieces of angle iron sharpened at one end and having a three-quarter inch hole at the other. Two wooden rollers from an old binder were obtained and each of these had its ends inserted in the holes of two angle iron stakes, which were driven into the ground. On these two rollers a large screen was laid and when this was filled with earth from the midden, it was not hard work to shove it backward and forward on the rollers, and the operator did not carry any of the weight. After the most of the earth was sifted out, the treasure hunt began, to pick from the screen the flints, pottery and bone tools remaining there, and good eyesight was needed for tiny arrows, bone needles, etc., were apt to be hidden by larger things and bone tools smeared with dirt were not easily recognized. Our illustration shows four men looking over a screen. One is a teacher in a technical school, one is a civil servant and the other two keen business men, all of whom find great relaxation in an occasional visit to the midden.

A further improvement in the screening apparatus is shown in plate 27. Here two side frames of iron, well-braced, are set up and

KITCHEN MIDDENS

connected by two bars of iron bent down so as to slide into slots in the side frames, thus holding them up. The rollers are then slipped into holes in the side frames and the screen set on as before. In this picture the reader can see the amount of work that has been done at one spot. The depth of the digging is shown at the left where the spade is leaned up against the bank and the heap of sifted earth under the screen is a good half-day's work.

The chief advantage of the new apparatus is that no stakes have to be driven and the whole apparatus can be lifted to a new spot without taking it apart.

One young man said, "There must be other ravines in other places with deposits similar to this, and I'm going to find one for myself." After a purposeful search he succeeded in finding one near the east side of Long Lake, which was considerably larger and even more prolific of splendid specimens. This one is not very near any town and for convenience we refer to it as the Lake Midden.

The artifacts found in the two middens are so nearly identical that we shall not always differentiate them, for there is hardly a kind of tool found in the one midden that is not also found in the other, although they are about forty miles apart as the crow flies and much more than that by road.



PLATE 27: SASK. MIDDENS. SOCKET HANDLE AWL. CHISEL. DAGGER. GOUGE. UNKNOWN TOOL. TWO SPATULAS. POINTED TOOL. THREE CUT-OUTS. SMALL POTTERY DOTTER. AWL BONE SPOONLIKE TOOL.

In a number of places in each midden there are beds of ashes, with a number of medium-sized stones blackened by fire surrounding each of them. Bits of burned bone are also found and we are not sure whether fragments of bone accidentally fell into the fire or whether they had used them as fuel. Near these fire-places the artifacts are more numerous.

One of the first bone artifacts to be recognized was made from a rib bone of a buffalo. It was broken off near the joint which attached it to the vertebra and the jagged edges were smoothed off by rubbing on sandstone. Next, about five or six inches farther along the bone where it was wider, the maker had cut a groove around the bone by sawing with a sharp piece of flint or quartzite. This was cut in far enough to allow the bone to be broken off and at the end, the softer, more cellular bone structure in the centre was gouged out to a depth of about an inch. This formed a handle with a socket into which could be inserted a small flint knife or scraper. These handles proved to be the most numerous of the bone artifacts and dozens of them were found in both middens. This may seem to be a trivial thing but do you know, all through the Palaeolithic period of the Stone Age, there is no recorded instance of a tool being fitted to a handle and no known case where a tool was made for the purpose of using it to make an-

other tool? Just why such a large number were needed, in comparison to other tools, we cannot say.

Later a different kind of bone handle was found, something like a jack knife handle. This was not made from a rib because a rib is always curved. The bone used was part of the flat bone which proceeds from a vertebra up into the shoulder of a buffalo. These bones are always quite straight and have sharp edges. A piece of this bone six or seven inches long was cut from it. The ends were rounded and frequently on one side the ends curved round to form small projections such as we see at the bottom end of a pocket knife. The sharp edges were cut off flat and on one edge, between the small projections, a slot was cut out into which a long flint knife could be put just as the blade of a pocket knife fits into the handle, only in this case the knife did not open and shut but was cemented into the handle with the cutting edge out.

In the Lake midden a handle was found where one end was rounded and had the projection but the other end was narrowed and thinned and the slot was made only at the small end and a thin cut went through to the other side. In this cut were found the corroded remains of a thin copper blade which had stained the bone green. No doubt this blade had been hammered thin from a small nodule



PLATE 28: BONE OBJECT. 4 BASAL KNIVES. SIDE HANDLE FOR FLINT KNIFE.

of pure native copper, such as are occasionally found near Lake Superior and along the Coppermine River.

Another bone tool which is fairly common in both middens is the spatula. These are flat tools with rounded ends. The majority of them seem to be made by splitting a rib. Some of these are a quarter of an inch thick and the edges look as though they had been used for pressure flaking, that is, taking the last little finishing flakes from the edge of a flint knife or spear head, by pressing the tool against it in a slanting direction. A few tiny ones are made from the flat rib of a smaller animal without splitting and are highly polished. Some of the larger ones are made from a piece of one of the larger hollow bones. This bone is very hard and I have seen one with almost a glassy polish and of a rich, reddish brown color, from age and use.

Both the socket handles and the spatulas were in some cases ornamented with diagonally-crossed lines and on several of the handles there is a rude outline of a fish while in one instance there was an engraving of an animal which from its sharp ears and nose and drooping tail would appear to be meant for a coyote.

On the edges of many of the handles neat notches have been cut in sets of twos, threes and fives, the numbers of notches corresponding on opposite sides of the same handle. A

few have continuous rows of notches all the way down the sides sometimes as many as twenty. Whether these were a tally for keeping a record of the numbers of certain things or whether all the markings of lines, engravings and notches were marks of ownership is difficult to tell.

The first great surprise came when a man discovered in Stony Beach Midden one of those straight bones from the shoulder hump of a buffalo with three nice holes bored through it. These holes were somewhat oval in shape and about a half inch by five-eighths in size. The specimen was in four pieces and he made a wonderful job of repairing it. The man who made this discovery was well read in European Archaeology and at once he said to himself, "Why, twenty thousand or more years ago the Aurignacians in France made bone and ivory tools with holes like this."

I might explain that the first specimens found in France were so beautifully made and ornamented with engraving of animals, etc., that the archaeologists took them to be wands of office or symbols of authority and accordingly named them the "baton de commandement." Later, however, they discovered a much more prosaic use for them, namely, that they could be slipped over an arrow shaft and pried in such a way as to take a bend out of it. So finally they called them shaft straighteners.

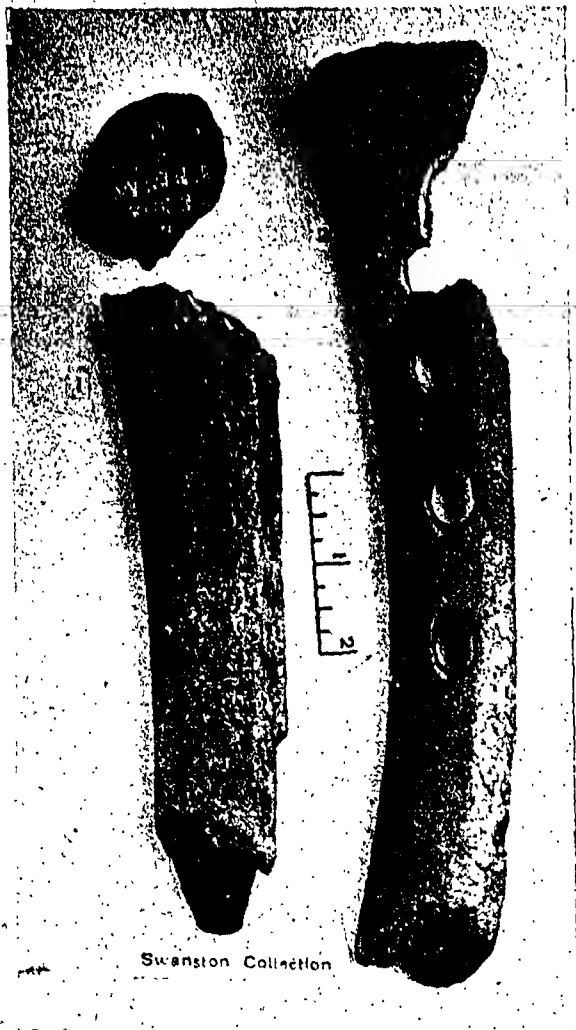


PLATE 29: POTTERY MARKER, THONG SOFTENER.
L. MIDDEN SCALE 3 5.

The Eskimos use a similar thing. For these reasons we all began calling this tool a shaft straightener. A little later another of our young men found one of these in the same midden but it was made of a fine piece of rib bone and quite polished. Three or four others, either complete or partial, were found in the Lake Midden.

After more mature consideration some doubt arose in our minds about these tools. It was noticed that the ends of each hole on both sides were worn smooth and slanting, making the holes somewhat oval and leaving fairly sharp edges at each end of the hole; this making it rather unsuitable to pry on a shaft. After searching our minds for a likely cause of its being worn in that way we came to the conclusion that these tools must have been used as a thong softener. If a strip were cut from a thick hide it would have square corners and might be stiff from the tanning. If one of these strips were threaded through these holes in succession, and if the thong were held fairly tight while this implement was pushed backward and forward it would have the effect of limbering and softening the strip and rounding off the corners so as to make a soft, round cord for tying things or lacing garments or footwear.

Another member got a pleasant jolt when he dug up a spear head about three inches long,

made of bone so strong and fine that it looked like ivory. It was very much like the Yuma spear head having a long, straight shank a little narrower than the blade, cut square at the bottom and having no notches. Three other were found, two from the Stony Beach Midden apparent spear heads about four inches long and one from the Lake Midden. These latter were the shape of some arrow heads with notches near the lower corners and smaller notches all up the sides to the points. These, however, were cut from thin tabular bone such as the thin, flat part of a blade bone and I am sure would not be strong enough for offensive use (fig. 3, plate 30.) They must have been for ceremonial use or for ornaments. Two other fine cutouts made of harder, thicker stuff shown in figs. 4 and 5, plate 30, must have been pretty trinkets before they were broken.

One tool that is found in every midden in the world is the bone awl. There are three kinds found in the Saskatchewan middens. The best are made from a strip cut from one of the bigger bones, rubbed into a round shape and sharpened to a needle point. Others are made from small bones with a joint on one end for a handle and rubbed to a sharp point at the other end. A third kind is a kind of cutout probably from a split rib or other thin bone.

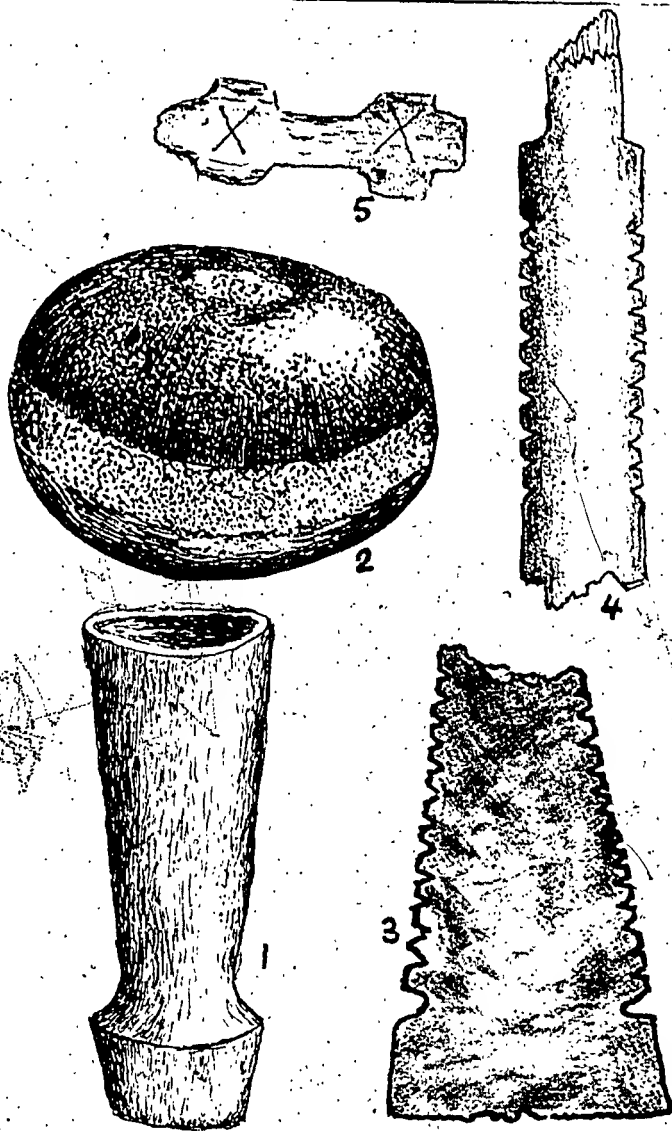


PLATE 30: 1. POTTERY TUBE PIPE. 2. CHIPPING HAMMER. 3. CUT-OUT
SPEAR HEAD. 4. AND 5. BONE ORNAMENTS

A good example of one made from a natural bone is shown in fig. 5, plate 9, from the shell heaps of Nova Scotia, and samples of exactly the same type are found in the Saskatchewan middens.

A number of bone implements are found in both middens which can only be interpreted as daggers. They are usually made from the larger bones. One found in Stony Beach Midden is just a long strip cut or broken from a large hollow bone and the end is plainly whittled to a sharp, flat point. The majority of them have retained a joint at the base for a handle. Where the joint used was a hinge joint it made quite a pretty rounded handle as shown in fig. 4, plate 27; also fig. 1, plate 31. The name dagger at once suggests fighting between human beings but I do not think there was as much of this as some people imagine, for these people were too busy trying to get a living to fight with each other. A dagger could be used for many purposes. I remember reading in "The Cloister and the Hearth," by Charles Reade, how a young man in those early days returned from Italy, that centre of refinements, and reported seeing certain men using a "bifurcated dagger," to convey morsels of meat to their mouths. In other words, he had seen for the first time a two-pronged steel table fork. It is hardly likely that these daggers were used for this purpose, although they could be.

It is much more probable that midden etiquette allowed the people to do as Richard I of England is represented as doing, namely, to hold a bone in his hand and gnaw the meat from it as he sat watching a tournament. The midden people probably cleaned the last remnants of meat from a bone by the use of small flint scrapers which would account for our finding so many "thumbnail" scrapers which are too small for any other use. Professor Sollas tells of finding at Solutre bones which showed marks very probably made by these scrapers and if a tiny shaving of bone came with the meat it would be a good food for providing calcium.

Two tools have been found, one in each midden, that are of the nature of a gouge. Both are made from hollow bones broken so as to get a long strip. The end is then sharpened to make a curved chisel or gouge. In one case, however, the bone is thicker and harder and has been ground to quite a sharp edge and then notches have been cut in the sharp blade. This tool is probably a flesher and was used to scrape off any remnants of flesh left on a hide and thus prepare it for tanning. The flesher has been in use among several tribes but instead of cutting a strip down the side of the bone, the whole bone with the joint was used and the other end cut off at an acute angle and here again the notches were cut in the sharp chisel edge.

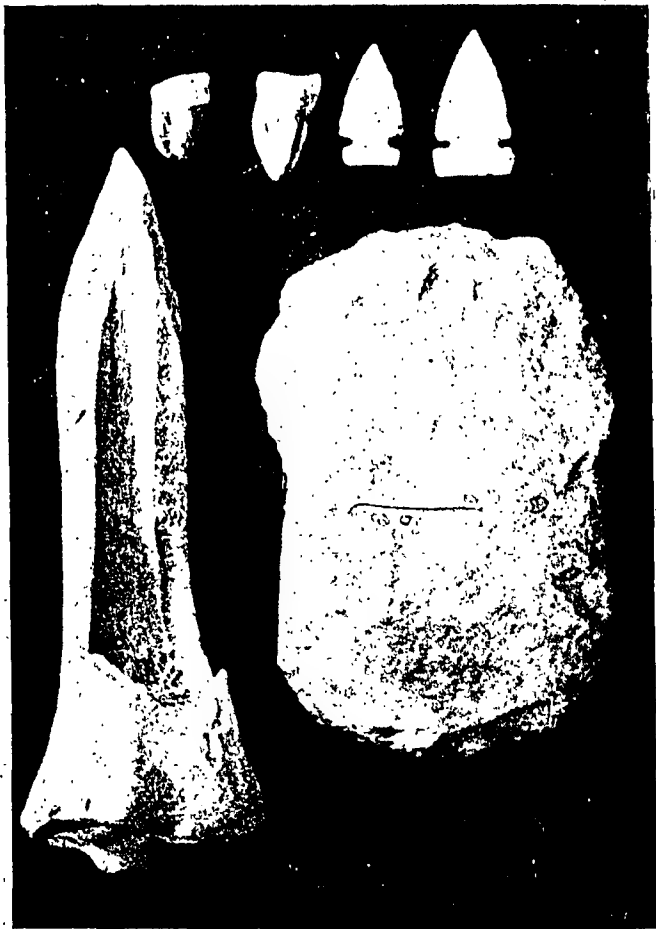


PLATE 31: TWO HUMAN TEETH, TWO ARROWS, BONE DAGGER,
STONE HOE.

Stone hammers are not common in the Saskatchewan middens and the majority of those found were so near the surface that they probably were dropped on top of the ground after the real midden people had deserted the site. One neat little hammer was found so deep in the Stony Beach Midden that we could not doubt that it was a real midden product. A picture of this one is seen in plate 32. A fragment of another small hammer was found in the same midden, showing a piece of the groove. Still another slice off the side of a larger hammer was found in the same midden but this was considered to be too good to be entirely wasted and at the ends of the part of the groove left on it wide notches were made so as to transform it into a rude hoe; and because the larger end was rather thick some chips were taken off the larger end to thin it down.

Although a number of stone plates or parts of them have been found in the fields above the midden, only one so far as I know has been found in the midden. This one is not complete but the three pieces recovered, when fastened together form about half of the plate. It is made of a fine grade of mica schist and is quite smooth. When complete it would be of an oblong shape and it has no rim but only a flat edge.

In both middens a number of flint knives are found, mostly rather small, though in the Lake Midden especially, some very fine ones are found, as large as three to four inches in length. One kind is especially notable. A picture of it is shown in plate 27. As shown by the picture, the shape is nearly that of an isosceles triangle with one of the corners at the base slightly rounded. The base is the cutting edge and some of them are quite sharp. We call them basal knives. Some of them are decidedly smaller than the one shown.

A great many small scrapers are found of the type referred to in a preceding paragraph, and literally hundreds of them have been found in the two middens. There are no very large scrapers, not even two inches long.

The arrow heads found in the middens are all of two types with a few exceptions. The commonest type is short triangular with a slight curve on the two main edges. The base is straight across, and exactly parallel with the base two square notches are cut in. In many cases these notches are wider at the inside end than at the opening. One peculiar thing about these is that the base is invariably ground off perfectly smooth, whereas most arrows have sharp, slightly uneven edges all around. Another type is purely triangular with three straight sides, all sharp, and no notches. A few of the first type have only one notch. One or

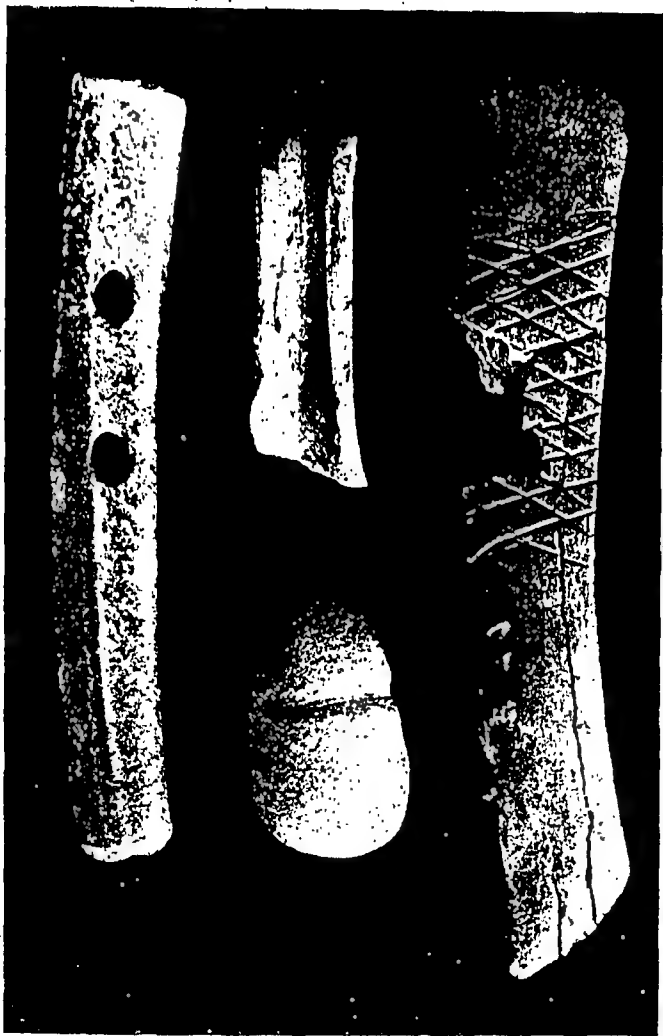


PLATE 32: 1. THONG SOFTENER, 2. GOUGE, 3. POTTERY MARKER, 4. HAMMER. S.B. MIDDEN SCALE 3/5.

two arrows have been found which narrow down to a small stem. The greater part of all these types are less than an inch in length, though a few very skilfully made ones of the first type exceed an inch. Most of this latter type are of chalcedony or agate, quite translucent. The average run are of brown chalcedony or white opaque flint.

A few small chipped tools of spatulate shape are found and a considerable number of flint awls, drills, or boring tools have been recovered but many of these are small and indistinct though at least one was found in Stony Beach midden that was as good as any found outside the midden.

Perhaps the most interesting study presented by the middens is that of the pottery remains. The specimens found are quite crude as to material. It is dark and earthy in appearance and to the touch, and there is no attempt at a glaze. The common clay from which they are made is tempered by an admixture of either crushed clamshell or coarse sand. In several fragments tiny stones over an eighth of an inch in size can be plainly seen and in others the fragments of pearl glitter quite noticeably. It is thought that without this mixture the pottery is very apt to crack in the burning. All the pottery is well baked and quite hard.

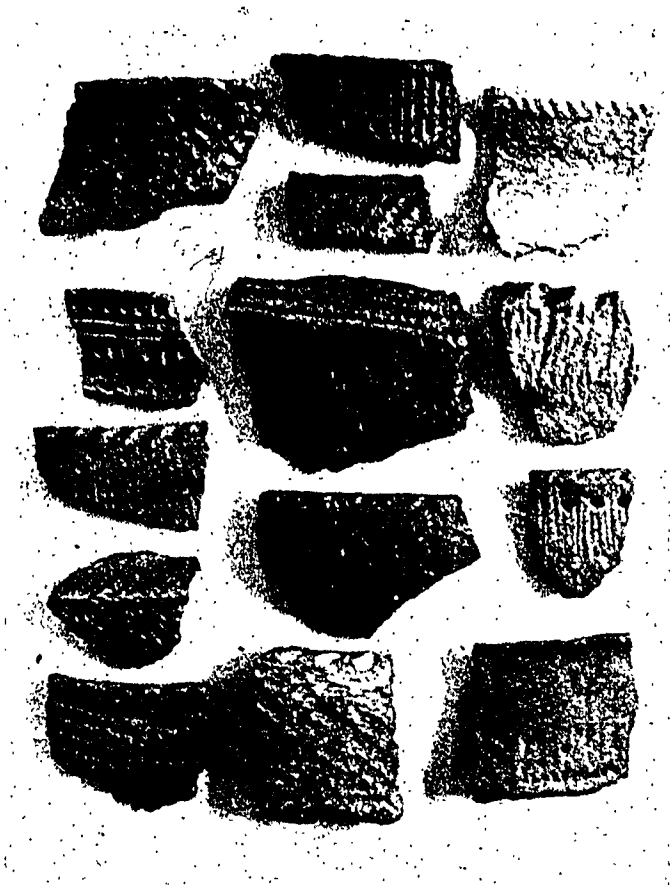


PLATE 33: POTTERY FROM TWO SASKATCHEWAN MIDDENS.
REDUCED.

The rims of the jars are usually thicker than the rest of the vessel and have a flat top, so that any decoration on the rim is quite noticeable to anyone looking down at it. The rim decorations are very varied. Some have nicks cut along the side of the rim; some have impressions of a round stick, plate 34; some have lines straight across. There is much cord impression both on the rim and on the neck and sides of the vessel. For a description of how the cord ornament is produced we refer the reader to the part of this book dealing with the pottery of the Nova Scotia shell heaps, where a good picture will be found.

Some rims have one, two or three little grooves running right around the rim. Others have a zig-zag line all around the top. Much use is made of incised lines marking out triangles with rows of dots beside or between the lines. Sometimes these dots are little impressions of the end of a tool like the little one shown in plate 27. Sometimes a quill is used to make these punctate dots, in which case a small projection is seen in the centre corresponding to the hollow of the quill. Some rims and shoulders have a succession of pinched points with the hollows made by thumb and finger in between, and in many of these the impression of the thumb-nail is quite evident.

In some jars the whole of the sides is covered with little ridges crossing each other

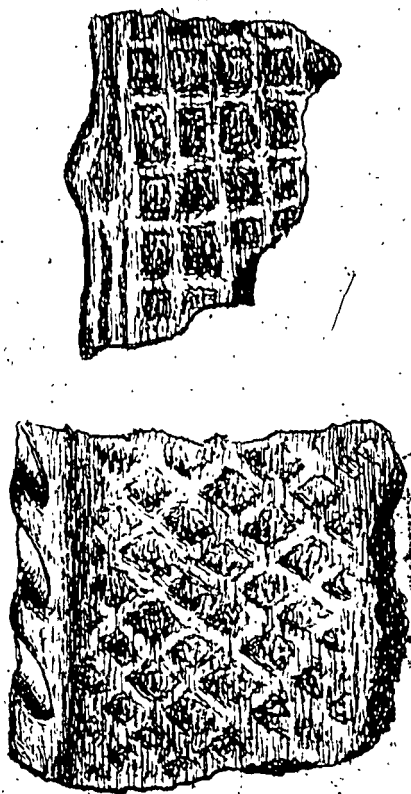


PLATE 34: POTTERY SHOWING MARKINGS MADE BY TWO BONE MARKERS

to make squares. In "The Stone Age on the Prairies," the author suggested that this probably was made by the use of a wooden paddle or marker having cross grooves cut into it. When this was pressed on the soft clay pot, ridges would be made corresponding to the grooves in the marker. Since then a flat bone from the shoulder hump of a buffalo, with crossed grooves cut in it, was found in Lake Midden, proving the theory. Later again a similar one was found in the Stony Beach Midden, but this one had the grooves cut diagonally, making diamonds. Both these tools were somewhat decayed but pictures of them as they are appear in plates 29 and 32. Pieces of pottery with these markings are shown in plate 34.

In one piece of pottery there is a succession of tiny marks alternating in two rows around the neck which would give the impression that the maker had tried to imitate the track of a deer.

Several of our young men have tried to restore a vessel by glueing fragments together like the pieces of a jig-saw puzzle and in three cases they have succeeded in showing at least the general shape of the jar and a good idea of the decoration. In plate 35 we show one pieced together by Mr. A. Swanston. This one has some of the decoration described above and has an angle at the shoulder and a flat base.

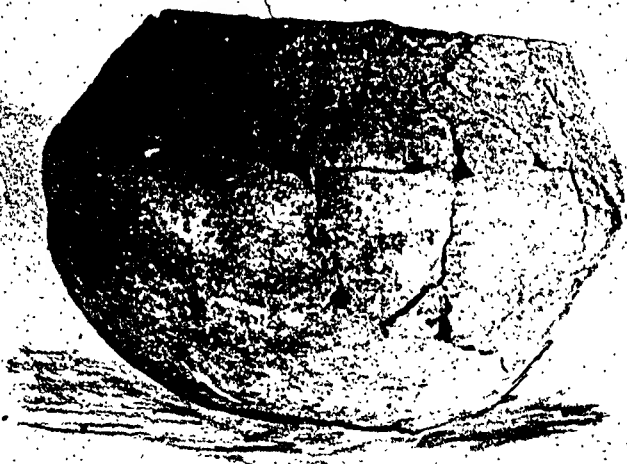
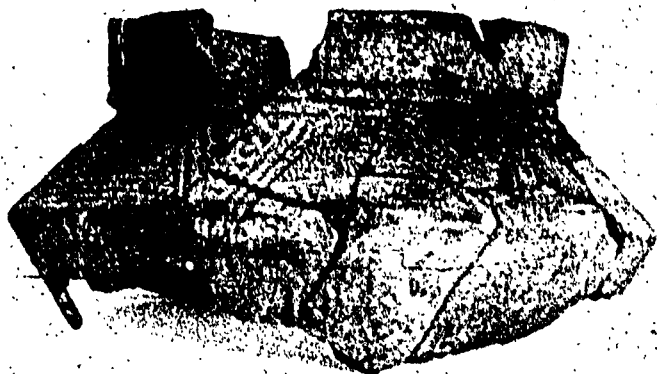


PLATE 35: ABOVE, POTTERY RESTORED BY A. SWANSTON. BELOW,
POTTERY RESTORED BY F. S. ROBINSON

It is quite a contrast to one shown in the same plate, reconstructed by Mr. F. S. Robinson. This one has no neck and no angle at the shoulder. The bottom is round and the walls curve up to the opening at the top, with no neck. Mr. George Hooey, of Swift Current, has reconstructed a large part of a bigger vessel with double curves at the neck, no real shoulder and coming to a round base, as shown in plate 36.

A fourth reconstruction has been made by the author, by drawing a picture. The details were easy to get. The size of the rim could be ascertained by fitting a curved piece onto different circles till you found the right size. In the same way the size of the circle at the base of the neck could be found and from this it was easy to tell whether the neck came straight down or slanted inward or outward, according as the circle at the base of the neck was of the same size or larger or smaller than the circle at the rim. Then the angle of the shoulder could be obtained from a fragment of the shoulder and the decoration could be made by repeating that shown in fragments. A picture of this one is shown in plate 36A.

Some idea of the number and variety of the clay vessels found or to be found in these middens can be gathered from the fact that I have a tray containing thirty-nine specimens and no two pieces have the same decoration, or belong to the same vessel.

A lot of these fragments of pottery are shown in plate 33, and the reader can amuse himself by trying to figure out how the various prints have been made. I have wondered whether in some cases a piece of bark of a small tree could have been used to make the imprint.



PLATE 36: POTTERY REBUILT BY GEO. HOOEY.

One article made of pottery which so far as I know has not been duplicated either in the midden or from any other source is the tube pipe shown in plate 30, fig. 1. Pipes of this pattern, made of pipestone, are not common and tube pipes of any kind are supposed to have preceded the pipes where the bowl is at an angle to the stem. At first the bend was only slight but later the bowls are at a right angle to the stem. This one, being of the old tube style and yet being made of pottery is certainly unique. A few fragments of pipe bowls have been found in both middens and while a few are of pottery there are several of stone and not always of pipestone or soapstone, either.

In both middens pieces of beaver teeth have been found which appear to have been shaped and sharpened for use as cutting or graving tools. Following the analogy of other middens we should expect to find some of these mounted in handles but so far as I know, no specimen of this kind has been found. Mr. Michel, however, showed me a bone handle like the jack knife handles described previously, but this one had no slot for a long flint blade, but instead had a hole bored through the handle from edge to edge through the softer part of the bone and this hole had the appearance of having been made for the insertion of such a thing as a tooth.

In a previous paragraph mention was made of certain things cut out of thin bone, two of them polished and apparently used as ornaments. In addition to this certain teeth were found in the Lake Midden, one of which was bored and the other had notches at the top, so that both of them could be suspended and used as a charm or in a necklace. These were two inches long, apparently teeth of a buffalo or a big deer, nicely colored and one of them seemed to be petrified. In Stony Beach Midden, a bulbous tooth of an elk was found neatly drilled. Oval shaped pendants, cut out of a clam shell and drilled at one end have been found in both middens. Flat beads consisting of a small disc of pearl with a hole drilled in the centre are found in both middens and in addition some pearl discs slightly larger and not drilled are found. Some have suggested that this was shell money but I think it more likely that they were used for a game. Some discs of pottery of about an inch in diameter made by rubbing fragments into a round shape and also one of bone have been discovered. The Aurignacians of Europe went to a great deal of trouble to make bone or ivory beads. They cut a strip from a large bone or tusk and ground it into a round rod. From this they cut sections and drilled them to make beads. No such laborious task was undertaken by the Midden people. They simply got a nice round bone from various birds and as the bones of

all birds are hollow they simply cut short lengths from this and thus had a round bead already bored. A picture of one of these is shown in plate 37. As the reader can see, it looks like a double length bead with a groove around the centre. One of these beads was found in the Lake Midden which had all edges rounded and polished. A remnant of the bone from which they were cut is seen in the same picture.

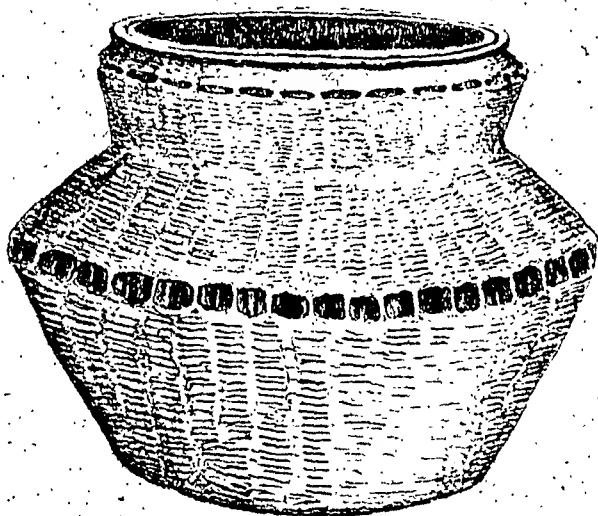


PLATE 36-A: POTTERY AS RESTORED BY W. J. ORCHARD.

It might be quite in order to say something here about the faunal remains found in the middens for it is nice to know what animals the midden people had to use or contend with. A few whole skeletons of buffalo are found but in the main they are dismembered and many of the large bones have been cracked to get the marrow. Distinctive jaws of large deer and the bony parts of deer hooves of several sizes are common but pieces of antler are not common. One piece of antler, about three and a half inches long, was found in the Lake Midden, which was completely hollowed out. Perhaps the absence of antlers is accounted for by the fact that rodent animals love to eat away at them, and in any case they decay more quickly than bone.

Jaws of carnivorous animals varying from the jaw of a tiny species of weasel up to kit fox, coyote and two kinds of large wolf or dog are much in evidence and in Lake Midden two or three complete skulls of an extinct species of wolf have been found and verified by scientists.

A vertebra of a comparatively small animal has a considerable upward projection which would suggest that the animal had a hump on its shoulder, but what animal of that size would have a hump I am unable to say. If it had been from a baby buffalo the bone would have been so soft that it would have disappeared and in any case it is too small.

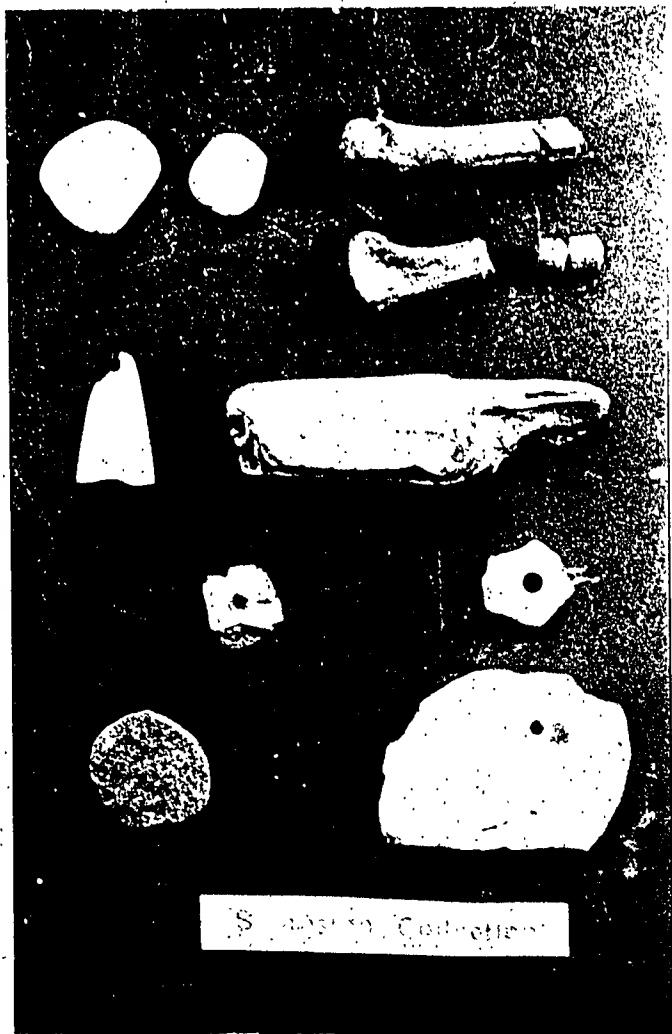


PLATE 37: LAKE MIDDEN. BONE BEAD AND REMNANT OF CUT
BONE, BIG TOOTH PENDANT, BROKEN PEARL PENDANTS.
PEARL BEADS, POTTERY DISC, PEARL DISCS.

Two human teeth in a good state of preservation were found but so far as I know they are the only human remains found in the middens. A few bones of fish appear but as a rule these are too small to last long. The clam shells found in the midden are thicker and more widely arched than the ones found in the rivers and creeks today. Taken all together the animal remains would indicate a great age for these middens.

As mentioned previously the remains of molluscs and fish are not plentiful in the Saskatchewan middens, which is quite what might be expected in middens located so far from any large body of water; and following the same line of thought we should hardly expect to find harpoons here. However, one specimen was discovered in the Lake Midden, which could hardly be interpreted otherwise. It consists of a square rod of bone about six inches long and a quarter of an inch in width on each side. I write this from memory as Mr. Swanston's collection is now in the National Museum at Ottawa. It is fortunate that I had photos of this and other things before I knew they were going away. However, I think those measurements are near enough for all practical purposes. The bottom end is thinned by cutting off nearly a third on each side, leaving a shank which could be inserted in a slot at the end of a shaft. The other end has a slot which appears

to be made for the purpose of inserting such a thing as a flint triangular arrow point. One side of this slot is broken away. Down one of the sides there are small projections which come out squarely and turn down at right angles to a point. These seem to be meant for barbs but would have a hard time getting into the flesh were it not for the supposed flint point which would cut wider than the shaft. Eskimo harpoons, though of a different pattern, frequently have a flint point. This specimen is the only one found in either midden and it is shown in plate 39.

In both of the Saskatchewan middens, as in other middens, chipping hammers are found. These for the most part are natural pebbles of quartzite, usually of a flat, round shape, but some are more blocky. They can be recognized by the abraded edges worn off by tapping against flint and stone in the making of artifacts. In general over the province the best chipping hammers have a little depression chipped out on each side for the thumb and finger. Just one of this kind was found in Lake Midden and only a start has been made on the two depressions but a distinct band of abrasion goes right around the edge. This one was blackened by fire. A good picture of it is shown in plate 30.

A number of coarse quartzite scrapers are found in which one side is formed of the natural



PLATE 38: FAUNAL REMAINS FROM TWO SASKATCHEWAN MIDDENS.
SEE TEXT.

smooth crust of the big pebble from which they are made. The other side is chipped to make a sharp edge all around. These are nearly circular and would be push scrapers, being pushed across a hide with the smooth side down. One large circular flake shows no secondary flaking but has been worn to a smooth, rounded edge on all sides.

A cylindrical stone about seven inches long and two inches in diameter and tapering towards both ends shows hammering on both ends and on the sides there are four roughened spots showing that it has been used as an anvil stone. This with two sharp quartzite discs is shown in plate 40. In the same plate is a basal knife and a small chipped spatulate tool.

A circular rubbing stone about three inches in diameter and an inch and a half thick was dug up near a fireplace in Lake Midden. The top and bottom are perfectly flat and the edge goes straight down. It was completely black from the fire. The chipped flat quartzite rubbing stone shown in plate 40 has a smooth flat bottom being part of the natural face of the large pebble from which it was made. It is of the nature of a high-back scraper and was used for cleaning and softening the hides in the process of tanning. The great majority of the artifacts found in all the middens are utilitarian and the making of them was dictated by the necessity for such tools. The only exception



Swanston Collection

PLATE 39: L. MIDDEN, TWO HORN OBJECTS, BONE SPATULA, BONE AWLS, HARPOON

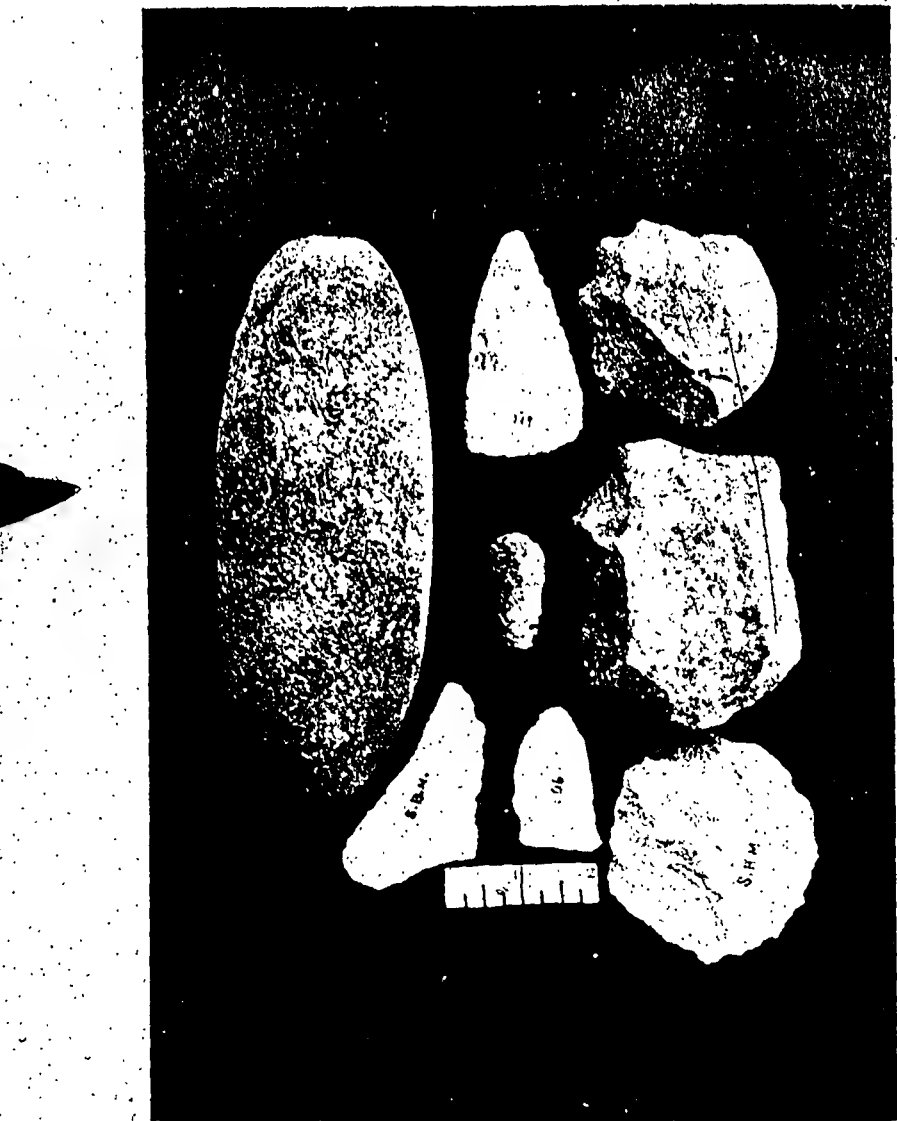


PLATE 40: STONE TOOLS FROM SASK. MIDDENS. HAND HAMMER. BASAL KNIFE. TWO SHARP DISCS. SMALL SPATULATE TOOL AND RUBBING STONE.

is the few ornaments which would be due to artistic sense and a desire to improve their appearance.

If some of my readers have their imagination fired by this account of various middens and wish they had access to one of them, let them make sure that they haven't one in their own pasture or in a nearby ravine. Several cottagers at Regina Beach and at B-say-tah Point, on Echo Lake have discovered bone artifacts on their lots and I hear rumors of middens near Crystal Beach at Buffalo Gap, west of Cabri, and sixty miles south of Regina. If you find one I shall be glad to hear of it.

I hope my readers may find this booklet both interesting and informative and I believe it will have some value as a permanent record.

The Scottish Shell Heaps

We mentioned in a previous chapter that at Oban, in Scotland, there was a cave with deposits of the Azilian culture. Let us now go into this a little more fully, because here as in other places the Azilian stage of culture was succeeded by a shell heap culture merging into the Neolithic. Some quarry-men were taking out stone for building purposes when they discovered what is now known as the MacArthur cave. In this cave was a deposit of black earth in which were found human remains, of a longheaded race. There were so few other things that it was inferred that the cave had latterly been used as a burial place. However, below this layer there was a deposit of shells and rubbish containing Azilian harpoons. These Azilian harpoons are unmistakable as they are made from the horns of the red deer. The horns of the red deer are spongy in the centre, so it is really only the outer crust that is hard enough to use for a harpoon. Consequently the harpoons are quite flat; and whereas the bone harpoons of the Magdalenians had a projection on each side of the base, so that they could be tied to the shaft and would

not be lost if they came loose, the Azilian harpoons frequently had a long-shaped hole in the base.

All the implements found in the shell deposit were of bone or horn, except three hammer stones, and below there were many bones of animals that had been eaten. Below this shell deposit was a layer of gravel and below this a mixture of gravel and shells.

The mouth of the MacArthur Cave is now about thirty feet above high-water mark and back about a hundred yards from the beach.

It would appear then that the cave was first used as a shelter for Azilian hunters at a time when the land was much lower than at present, allowing the sea to come close to the mouth of the cave. Then after some deposits had accumulated a great storm came up and the waves were driven into the cave carrying in a certain amount of gravel. This gravel formed a new floor on which fresh deposits of food refuse were laid down. After a time the land was elevated so much that the cave was raised above high-water and the sea retreated from it. This caused its abandonment by the troglodyte hunters. Then at a later date when it was no longer used by the shell heap people it became a burial place for Neolithic men.

These facts about the MacArthur cave throw a good deal of light upon another shell

heap deposit near by, at a place called Druimvargie.

At various times all through the palaeolithic period, especially when the climate was a little moderated, people resorted to what are called rock shelters. These usually were ledges of rock against the face of a great rock, in fact, frequently overhung by the rock, generally facing south and frequently on the bank of a river. Apparently this practice extended on into the transition period for here at Druimvargie the shell heaps are in just such a rock shelter overlooking a marsh.

In this marsh remains of a lake dwelling were dug up. This is quite interesting because the lake dwellings of Switzerland carry on into the bronze age some of the characteristic implements of the kitchen middens, the most notable of which is the tranchet.

The lowest level of the marsh is only slightly above sea level at present, so if we bear in mind that the MacArthur cave has been raised about thirty feet we can see that before that elevation the marsh must have been a little bay almost surrounded by land. So in this transition period at this point there were three kinds of residences, the cave, the rock shelter and the lake dwelling.

The remains at Druimvargie were very similar to those in the MacArthur cave and

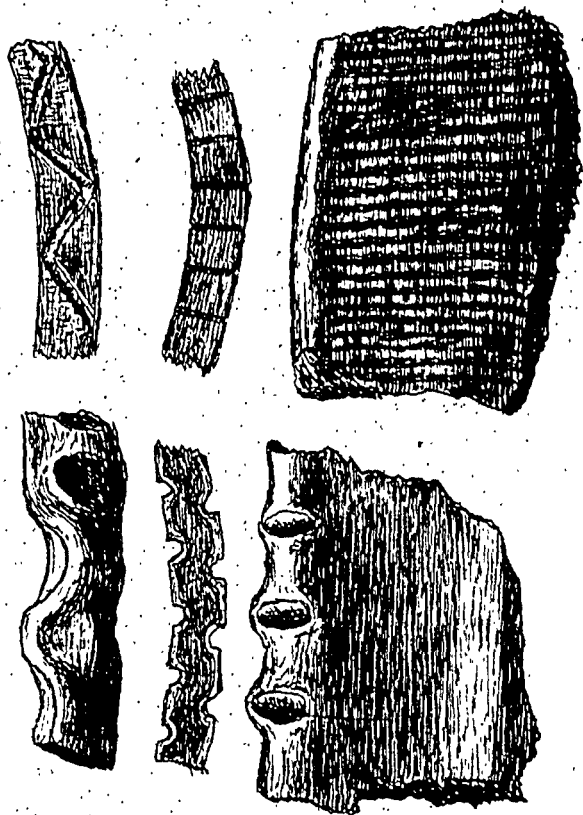


PLATE 41: POTTERY RIMS

strange to say, presented some points of resemblance to our Saskatchewan middens. One quite prominent tool was a kind of round-nosed chisel which from illustrations shown was almost identical with the one shown in our plate in the right upper corner. Also there were long hammerstones, very similar to the one shown in our plate though the ones at MacArthur and Druimvargie were usually hammered at only one end and were rather pointed at the other end. These were called by the archaeologists of that time limpet hammers. The limpet, as the reader probably knows, is a shell fish which clings very tenaciously to the rock, so much so that we have the proverbial expression "cling like a limpet." The limpet is covered by a round univalve shell with a hole in the centre.

The reader will remember that the ancylus age in Denmark was named from a freshwater limpet which was a main article of diet at Maglemose before the ocean broke into the Baltic Sea.

Just how the limpet hammers would be used to detach the limpets is not very clear. Whether they smashed the shell or drove the pointed end under the edge of the shell I am unable to say.

Another tool found here is a pointed tool of horn similar to two shown in plate 39 of the Saskatchewan Middens. They look as

though a horn were cut off two inches or more from the point and the larger end rounded and smoothed.

A number of very interesting shell deposits are found on the island of Oronsay and Mr. Samuel Laing, a co-worker with Professor Hardy, describes some shell heaps which he examined as remains of "the earliest race of human inhabitants of Britain," and judged them to be similar to and contemporary with the Kjekken Moddinge. This seems hard to explain, in face of the fact that these transition deposits are much later than say, the Mousterian or Aurignacian. However, owing to the fact that Scotland was covered with ice while the Southern part of England was occupied by various Palaeolithic people, many of the earlier cultures are not represented at all in Scotland.

It seems as though when changes in the relative levels of land and sea take place that they take the form of undulations, that is, as one part of the land is raised another part is lowered. This is true of Britain, for while Scotland was raised, England was lowered. All around the coast of England the sea is encroaching on the land and although on the east coast part of this is due to the eroding action of the waves undermining cliffs, etc., yet on the west coast at Land's End and along the coast of Pembroke it is possible when the water is calm and clear, to look down and see sub-

merged forests and even according to tradition to catch sight of the towers of drowned cities. A fine account of this is given very fully in "Lost England" by Beckles Willson.

This condition probably accounts for the fact that no shell heaps are found around the coast of England. If there ever were any, as is quite probable, they are now beneath the waves.

Several similar deposits of marine shells containing tools of flint and quartzite of a very rude type also chisels, spatulae, awls, etc., of bone and horn are scattered along the left bank of the Tagus in Portugal. These deposits are high above sea level and several miles from the sea; but here again as in the other places it is believed that when these shell mounds were made the sea extended up the valley of the Tagus as far as the shell mounds.

No polished stone tools are found in these mounds, no pottery and no remains of domestic animals. In these mounds are a number of burials at various depths. The majority of the skeletons have long heads and are palaeolithic. The others are of a short-headed race, probably neolithic, which were just beginning to spread westward, bringing their neolithic arts with them.

Did this particular type of culture arise sporadically, at about the same time, in such widely-separated places as Denmark, Scotland, France, and Portugal, or was it carried there by some race of men? I don't think that any scientist has yet found decisive proof in this matter.

Regina, Jan. 15, 1946.

W. J. Orchard.

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- Human Origins McCurdy
- Prehistoric Britain Munro
- Lost England Willson
- The Dawn of European Civilization .. Childe

Index

A

Adzes, 7, 23, 24.
Ainus, 60, 61.
Ancylos period, 8.
Axls, 18, 43, 88.
Azilian, 3, 4, 116.

B

Basal knives,
Baton de Commandement,
63, 85.
Beaver teeth as tools, 10,
20, 104.
Bone arrows,
Bone Comb, 11.
Bone daggers, 5.
Bone fish hooks, 7.
Bone needle, 14, 41.
Bone handles, 82.
Beads, 106.
Bodkin, 44.
Brachycephalic skulls, 32.

C

Capsians, 3, 38.
Celts, 11, 44, 61.
Chancelade skull, 35.
Chipping hammers, 22.
Cord impressions,
Cutouts.

D

Daggers, 5, 46, 90.
Dolichocephalic skulls, 32.
Dog, 14.
Drumvargis, 118.

E

Eburnae, 50.
Engraving on bone, 84.
Eskimo, 35.

F

Fish-hooks of bone.

G

Glacial Period, 69.
Gorge, 43.
Gorgetts, 24.
Gouge.

H

Hammers, 93.
Harpoons, 11, 18, 47, 110.
Hazelnuts
Horn axes, 10.
Horn sockets, 10, 46.

J

Jade, 44.
Japanese shell heaps, 58.

K

Kjokken Moddinge,
Knives, 94.

L

Lake Midden, 79.
Littorina period, 8.

M

Magdalenians, 1, 2, 37.
 Maglemose, 4.
 Mândans.
 Markers for pottery.
 Marpolé, 27.
 Merigomish, 17.
 Maz-d-Azil, 3.
 Microliths, 4.
 Mjé-Maes, 25.
 Mortars, 50.

N

Neolithic, 2.
 Nest of skulls, 37.

O

Oblique knives, 63.
 Oban, 116.
 Obsidian.
 Ofnet, 37.
 Omori, 60.

P

Perforated teeth, 20, 52.
 Pestles, 50.
 Pendants, 105.
 Picks, 7, 10.
 Pile dwellings, 15.
 Pipes, 25, 104.

Pointed base pottery, 13, 25.
 Pottery, 13, 96.
 Pottery markers, 22.

R

Rock paintings, 3, 37.

S

Saskatchewan Janus.
 Scrapers, 11, 91.
 Shaft straighteners, 85.
 Sled.
 Skulls.
 Spatula, 84.
 Soapstone vessels, 50.
 Socket handles.
 Stone image, 39.
 Stony Beach Midden, 74.
 Swan in middens, 5.

T

Talleys, 85.
 Teeth, human.
 Teeth for knives.
 Thong softeners, 87.
 Thunder mallet, 63.
 Tranchet, 11, 118.
 Transition period.
 Trepanning, 49.



